DOCUMENT RESUME

ED 447 541	CS 510 458
TITLE	Proceedings of the Annual Meeting of the Association for Education in Journalism and Mass Communication (83rd, Phoenix, Arizona, August 9-12, 2000). Science Communication Interest Group.
INSTITUTION	Association for Education in Journalism and Mass Communication.
PUB DATE	2000-08-00
NOTE	140p.; For other sections of this proceedings, see CS 510 451-470.
PUB TYPE	Collected Works - Proceedings (021)
EDRS PRICE	MF01/PC06 Plus Postage.
DESCRIPTORS	Citizen Participation; Higher Education; Journalism; *Journalism Education; Meetings; News Media; *News Reporting; Television Research
IDENTIFIERS	Environmental Reporting; Expertise; Water Conservation; Year 2000 (Programming)

ABSTRACT

The Science Communication Interest Group section of the proceedings contains the following five papers: "Accounting for the Complexity of Causal Explanations in the Wake of an Environmental Risk" (LeeAnn Kahlor, Sharon Dunwoody and Robert J. Griffin); "Construction of Technology Crisis and Safety: News Media's Framing the Y2K Issue" (Ju Yong Ha); "The Visual Presentation of Expertise: Y2K Experts on Television" (Joshua Greenberg); "Theory and Practice of Public Meetings" (Katherine A. McComas); and "Understanding Environmentalism and Information Effects in Water Conservation Behavior: A Comparison of Three Communities Sharing a Watershed" (Craig W. Trumbo and Garrett J. O'Keefe). (RS)

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CS 510 458

Science Communication Interest Group

Accounting for the Complexity of Causal Explanations in the Wake of an Environmental Risk

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This material is based upon work supported by the National Science Foundation under Grant No. SBR-9316615 and by the National Safety Council's Environmental Health Center.

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Abstract

In 1993, Milwaukee-area residents experienced a nationally publicized outbreak of cryptosporidium, a parasite, which infested the metropolitan drinking supply and sickened some 400,000 people. Using survey data gathered from 610 adult residents in the wake of that outbreak, this study looks at predictors of the complexity of people's understanding of two causal components of the outbreak: 1) how the parasite got into the water supply and 2) how it causes illness once in the human body. Analysis of open-ended data indicated that, consistent with the knowledge gap hypothesis, socioeconomic status is a significant predictor of differences in explanatory complexity. And, consistent with the literature on motivation and knowledge seeking, experience with and worry about the parasite also served as predictors of explanatory complexity under certain circumstances. We were unable to establish a relationship between complexity and media use.

Accounting for the Complexity of Causal Explanations in the Wake of an Environmental Risk

Introduction

In 1993, Milwaukee faced the nation's largest outbreak of waterborne disease on record. The protozoan cryptosporidium got into the city's drinking water and caused diarrheal illness in nearly 40 percent of Milwaukee area residents, according to a state-funded survey. Although cryptosporidium had been relatively unknown to the general public, Milwaukee residents were deluged with information from the mass media, ranging from speculation about who was to blame for the outbreak to recommendations about how to minimize individual exposure.

A few months after the outbreak, a survey of 610 Milwaukee residents examined factors that might influence their use of various communication channels for information about this hazard. The data contained in that survey offered insight into how people's media use and their experience with cryptosporidiosis, the illness caused by cryptosporidium, may relate to their understanding of, among other things, the factors that contributed to the outbreak, the likelihood that such an outbreak could occur again, and the ways in which illness could be avoided if another outbreak did occur.

More specifically, the presence of two open-ended questions in the survey provided us with a chance to study the complexity of individuals' understanding of the outbreak and the extent to which that complexity was linked to information use. Our goal was to explore factors that may have influenced the depth of people's understanding of the chain of events that led to this widespread threat to public health. The two open-ended questions sought explanations of causal processes. They asked, "In your judgment, where did the cryptosporidium come from and how did it get into the Milwaukee water supply?" And, "In your judgment, what does cryptosporidium do in your body to make you ill?"

The problem

Knowledge complexity

Understanding the complexity of people's "knowledge" essentially means understanding the way that knowledge is organized. When dealing with complex information, individuals need more than just kernels of information or miscellaneous facts in order to move beyond a cursory understanding; they need a means of tying together the bits of information, of structuring knowledge so that it is meaningful and readily accessible in memory. Genova and Greenberg (1979) assert that it is the extent to which information is organized in an individual's cognitive system that allows the researcher to distinguish mere "acquaintance with" from actually "knowing about" a given subject. Genova and Greenberg use the terms "factual knowledge" and "structural knowledge," respectively, to distinguish between these two types of knowing.

The concepts of "acquaintance with" and "knowledge of" can perhaps be better understood if one contrasts the novice with the expert. In their textbook on cognitive psychology, Medin and Ross (1997) write that novices are individuals who are relatively unfamiliar with a given knowledge domain, while experts are individuals who have experience with and understanding of a domain. The same individual can be an expert in one domain and a novice in another.

When novices encounter complex information, the authors explain, they are faced with the difficulty of knowing which knowledge from memory is relevant to the situation. In addition, they must rely on surface (or obvious) features of the problem, which inhibits their ability to move much beyond a cursory understanding. Novices also are more likely than experts to make mistakes by calling on inappropriate knowledge from memory. According to Fiske, Kinder and Larter (1983), this is because they are inhibited by the limitations of short-term memory. Because of their lack of experience, novices cannot rely on long-term memory to provide them with a structure for incoming information. Therefore, they are forced to use short-term memory for initial information storage, as well as for a workspace in which they can tie the bits of information together in some meaningful way. As a result, novices are prone to create a fragmented and perhaps even inaccurate understanding of the incoming information.

Experts, on the other hand, can overcome these obstacles via the use of knowledge that they have built up in long-term memory through experience. The knowledge they have built over time, according to Medin and Ross (1997), contains more than fragments of surface knowledge; it contains units of structured or organized knowledge that are the product of deeper understanding and elaboration. They can use this structure to guide their processing and, as a result, can detect relevant information quickly and efficiently. This means that, unlike novices, experts are not as inhibited by short term memory constraints and, therefore, are less likely walk away from that information with the inaccurate understanding that can result from strained resources.

Causal explanations

The ability to understand causal processes is key to an individual's ability to grasp much of the natural phenomena she will encounter in her lifetime.

To gain a sense of how individuals make sense of causal processes, Bass and Maddux (1982) employed causal explanations in their research on scientific explanations and reasoning. The researchers were interested in whether individuals who lack formal reasoning ability would have trouble learning (and remembering) complex causal explanations of natural phenomena discussed in a science lesson. They presented high school and college students with several explanations of relationships between gases, air and heat and they found that, although *simple* explanations were easily recalled by individuals who lacked formal reasoning abilities, complex causal explanations proved significantly more difficult for such individuals.

The importance of structural knowledge (expertise) was made clear in their findings. Bass and Maddux suggest that, when teaching complex causal explanations to students who lack formal reasoning skills, it may be beneficial to supply these students with some "external structuring" to enable them to link "various propositions of the explanation to one another" (533). This conclusion need not be limited to individuals lacking in formal reasoning skills; rather, based on the research of Genova and Greenberg (1979), it is likely to apply to any individual who lacks "expertise" in a given knowledge domain. Without a structure, unfamiliar information most likely will remain fragmented and unintegrated with existing knowledge.

The knowledge gap

Understanding individual differences in knowledge is not simply a matter of categorizing individuals as experts or novices in a given domain. It involves looking at the various factors that may contribute to the building of knowledge within that domain. Experience and motivation are two such factors. Doll and Ajzen (1992) assert that individuals who have direct experience with a particular issue are more motivated to assimilate complex information than individuals who do not have experience with it. In addition, Ajzen and Sexton (1999) assert that involvement with or interest in an issue will also increase motivation to attend to and process information about that issue; such motivation is likely to increase the complexity of a person's cognitions about that issue.

Another factor that contributes to knowledge building within a domain (and one that may influence motivation and experience) is socioeconomic status and the concomitant availability of information (Tichenor, Donohue & Olien, 1970; Ettema & Kline, 1977). In 1970, Tichenor, Donohue and Olien introduced the knowledge gap hypothesis, which asserted that "as the infusion of mass media information into a social system increases, segments of the population with higher socioeconomic status tend to acquire this information at a faster rate that the lower status segments, so that the gap in knowledge between these segments tends to increase" (159).

The researchers attribute this knowledge differential in part to the availability (or unavailability) of resources. Such resources, according to the authors, include reading and comprehension skills, existing background knowledge and relevant social contacts. The authors also attribute information availability to "the nature of the mass media system that delivers information" (162). The authors explain the nature of the print media as geared to the "interests and tastes" of higher-status segments of society (162). As a result, the print media, which are a primary source of science and public affairs information, have traditionally been more heavily used by higher status persons (Tichenor, Donohue & Olien, 1970; Ettema & Kline, 1977).

In addition, when less educated individuals do access the print media, they may lack the analytical skills often needed to tackle public affairs topics – particularly the more complex topics. Those skills may include training in public affairs or civics and access to additional background information (Griffin, 1990). Katzman (1974) also emphasizes differences in formal education, as well as differences in access to new communication technology as contributing variables -- both of which are rooted in available economic resources. It is also likely that, in some cases, differential availability can mean, literally, one's ability to purchase or otherwise gain access to an information channel; the cost of a channel may be beyond the capabilities of someone's pocketbook.

Media Impact

Because the news media are recognized as ubiquitous and important information resources, it is useful to consider the possible relationship between the ways in which the media present information and knowledge gain.

According to Bass and Maddux (1982), when individuals who lack formal reasoning skills (or, perhaps, expertise in a given knowledge domain) encounter new information, they may profit from a structure that assists them in assimilating that new information. That is, information presented in a structured manner may allow the receiver to process new information more quickly and, as a result, more efficiently. Structure allows the receiver to make connections between pieces of knowledge so that the end result is an organized and meaningful – and perhaps more complex – message.

Like all storytelling enterprises, the media make overt efforts to frame information through story narratives. Numerous scholars have emphasized the homogeneity and ubiquity of patterns of journalistic story framing across time and media (See Rachlin, 1988; van Dijk, 1988), and others have described a variety of textual levels within in any given story in which interpretive frameworks can be detected (Pan and Kosicki, 1993). However, tying these interpretative structures to audience interpretations has been more difficult, although experiments offer persuasive evidence that individuals do indeed seem to internalize text frames under some circumstances (see, for example, Iyengar, 1991).

When the parasitic outbreak occurred in Milwaukee, a unique situation arose in which individuals were suddenly bombarded with information about a topic that the majority of them had never encountered – cryptosporidium. As a result, many people may have lacked context for the information they were suddenly receiving. The media, thus, were faced with the challenge of informing novices without overwhelming their processing capabilities.

The default interpretive framework for any novel story in the media, argue researchers, is political. That is, journalists will be more likely to give meaning to novel information by talking to legitimized actors in the public policy arena and then framing that novel information is ways that reflect the actions of policy makers.

Griffin and Dunwoody (1997), in a study of newspaper coverage of environmental risks, found that a political/governmental frame was by far the most common interpretive choice. Such a political frame also was evident in a study of media coverage of AIDS. In an analysis of AIDS stories in the early to mid-1980s, Albert (1986) found that initial coverage emphasized such themes as deviancy, blame and punishment, all of which signal some degree of politicization of the illness.

In the wake of the 1993 cryptosporidium outbreak, therefore, it is possible that media coverage also would have emphasized political dimensions of the issue. In fact, much of the coverage immediately following the outbreak dealt with the responsiveness and responsibility of government agencies.

A political interpretation of the outbreak might have led media to emphasize some types of cryptosporidium knowledge over others. Specifically, we expect that local reporters would be far more comfortable tracking such political dimensions as "how did the parasite get into the drinking water" and "who's at fault" rather than physiological/biological dimensions such as "what is the parasite" and "what does it do inside of the body to cause illness?"

Hypotheses

We are interested in the complexity of individuals' causal explanations for 1) where cryptosporidium came from and how it got into the Milwaukee water supply, and 2) what the parasite does to the human body to cause illness. Based on what we know about the knowledge gap hypothesis, which asserts that individuals of higher socioeconomic status have more access to knowledge tools, we focus our first hypothesis on how socioeconomic status may influence the complexity of these two causal explanations. Therefore, our first hypothesis predicts:

H1: Socioeconomic status will be a statistically significant predictor of the complexity of both individuals' causal explanations of how cryptosporidium got into the Milwaukee water supply and their explanations for what the parasite does to the body.

We also are interested in how motivation may serve as a catalyst. According to Doll and Ajzen (1992) and Ajzen and Sexton (1999), direct experience and involvement or interest in an issue can be significant motivators. In the case of the 1993 cryptosporidium outbreak, we had measures of whether a respondent actually got sick from exposure to cryptosporidiosis, as well as judgments of how likely she was to get sick in the future and how worried she was about that possible scenario. These variables seem to be excellent measures of direct experience and of interest/salience. Our next hypothesis, therefore, is:

H2: Motivation -- defined by worry, perceived likelihood and personal experience – will be a statistically significant predictor of complexity of both causal explanations.

We are also interested in how media exposure may have influenced these explanations. Much of the coverage immediately after the outbreak dealt with the responsiveness and responsibility of government agencies. There was much discourse about who was to blame, with a sizable portion of the media focus falling on the municipal water plants' failure to filter out the contamination. If the media indeed framed this crisis as predominantly a "political" one, then we predict the media paid more attention to how cryptosporidium got into the water supply than to how the parasite interacted with the human body to make people ill. Therefore, our last two hypotheses predict:

H3: Causal explanations for how cryptosporidium got into the Milwaukee water supply will be more complex than explanations for what it does to the human body.

H4: Respondents' reported use of the mass media for information about cryptosporidium will be a significant predictor of the explanatory complexity of how cryptosporidium got into the Milwaukee water supply, but not of the complexity of explanations for what the parasite does to the human body.

Method

A professional research firm conducted a telephone survey of 610 adult residents who lived in the area served by the Milwaukee water works in 1993, approximately three months after the outbreak occurred. The survey explored risks stemming from lead in the drinking water and from cryptosporidium contamination in the Milwaukee water supply. Data from the latter are the focus of this report.

Sampling and data gathering

Residences were sampled by the random digit dialing technique, and adult respondents were randomly chosen within households. Interviews took about 25 minutes to complete and were conducted in the summer and early fall of 1993, a few months after the cryptosporidiosis outbreak had ended. The response rate was 53 percent of eligible respondents. To validate the survey, we compared demographic information from the sample with census data for the same area. Although the sample tends to slightly over-represent people with higher education levels, sample data otherwise closely parallel the known population demographics of Milwaukee, within sampling error.

Data were gathered in five broad categories needed for this analysis: (1) social structural variables; (2) media exposure and attention to stories about cryptosporidium; (3) risk experience, worry about risk and perceived likelihood of future risk; (4) an open-ended question soliciting an explanation of where cryptosporidium came from and how it got into the Milwaukee water supply; and (5) an open-ended question soliciting an explanation of what cryptosporidium does to the human body.

Social structural variables

Interviewers gathered information about the respondent's sex, age, race, education, annual household income, and whether the respondent owned his or her residence. Measures of income and education were standardized and summed to form an index of socioeconomic status (alpha=.56).

Motivation

Our three motivation variables -- experience with the parasite, worry about the parasite and perceived likelihood of experiencing it in the future – were collapsed into two variables. Because worry and perceived likelihood were strongly correlated (r=.63), we created an index from those two variables (alpha=.77). Because experience was only weakly correlated with the other two variables, we entered it separately into our regression analysis.

Knowledge complexity

Knowledge complexity was assessed using the two open-ended causal explanations. Each explanation was first scored for the number of constructs it contained. This "construct" concept is borrowed from Crockett (1965), who used it to describe the elements used by individuals to construct impressions of other individuals. In Crockett's research, these elements included personal descriptives. Zajonc (1960) used a similar concept in his research on personal impression formation, which he simply called attributes. Bass and Maddux (1982), in their study of scientific explanations, used a similar concept that they called "implications." Implications were cause-effect statements, such as "if *P* then *Q*." These were statements that linked causes and effects using such words as if…then, and, because, and so.

Although Bass and Maddux's scientific explanations most closely resembled the causal explanations we sought, the fit was not exact because it was unrealistic for us to expect our respondents to have answered the survey questions with structured implication statements. Thus, we modified the measurement scheme to fit the less structured nature of our data more closely. As a result, we decided to search our explanations for something we called "contributing constructs." That is, we located within the explanations words or strings of words that acted as contributing factors in the causal explanations.

To cull these factors from the larger text, we searched the text for clues that indicated when one factor ended and the next began. Such clues included conjoining words, such as "and," when used to connect independent clauses; punctuation, such as periods, dashes and commas (when used to separate independent clauses); and external probes by the interviewer. "I don't know" and other admissions of ignorance were not coded, nor were repetitive phrasings.

Consider the following response transcribed from a respondent asked for an explanation for how cryptosporidium got into the Milwaukee water supply:

"I figure it came from the sewers. The sewers clog up and that gets into the water system. If they had a better sewage system we wouldn't have that trouble [w/e] I don't know and they don't know either [w/e] I hear a lot of different stories – I heard of a dead cow from the Peck meat packing company – I also heard somebody dumped something into the water."

Our coding scheme isolated six *contributing* factors:

1. I figure it came from the sewers.
2. The sewers clog up
3. and that gets into the water system.
4. If they had a better sewage system we wouldn't have that trouble [w/e]
5. I heard of a dead cow from the Peck meat packing company –
6. I also heard somebody dumped something into the water.

Each contributing factor added a point to an individual's explanatory complexity score. However, because isolated facts are not as valuable as structured information, we also assessed the connectedness of these factors. This allowed us to assess the depth as well as breadth of the information. In order to assess connectedness, we searched the responses for conceptual relatedness among adjacent factors. This was similar to the approaches used by Crockett (1965) and Zajonc (1960) to assess the interrelatedness of constructs. In our coding scheme, conceptual relatedness referred to the sharing of substantive terms across factors or to an overt causal linkage such as the cause-effect implications used by Bass and Maddux (1982). Each linkage also added a point to an individual's complexity score.

In the above example:

1. Factors 1 and 2 are conceptually linked -- both refer to the sewers.
2. Factors 2 and 3 are linked via the word "and," which, when considered in conjunction with the logical connection between the two causal factors, indicates that factor 3 conceptually follows factor 2.
3. Factors 3 and 4 are linked via recurring use of the word "system" and the ongoing textual references to the sewers.
4. Factors 5 and 6 are linked via the coder's use of a dash, which is assumed to indicate a brief pause between conceptually related (but independent) clauses, and the repetitive use of "I heard."

(Factors 4 and 5 do not appear to be related.)

Total explanatory complexity scores were calculated by summing the number of contributing factors and the number of linkages within an explanation. In the above example, this score was 10 – six factors and four linkages. This additive index gives equal weight to both dimensions of complexity, a choice made because existing complexity measures don't offer compelling reasons to privilege one component over the other.

Overall, complexity scores ranged from 0 to 16 for explanations of how cryptosporidium got into the water supply; the mean score was 5, as was the median and the mode, and about 7 percent of the sample received a score of 0. Scores ranged from 0 to 13 for explanations of what it did to the human body to cause illness; the mean score was 4, the median and mode were both 3, and about 13 percent of the sample received a score of 0. Two coders conducted a reliability test, taking chance into account. Krippendorff's alpha was 1.0 for contributing factors and .89 for linkages, indicating acceptable reliability (Krippendorff, 1980).

Media exposure

Respondents were asked to indicate, on average, how many days a week they use various news media. Of particular interest to us were radio news, television news, and newspapers. Our intention was to create factor scores to allow for an index of general media exposure. However, preliminary examination of the data revealed that radio exposure was negatively related to the other two media variables, and the alpha for the reduced index was too low (.34). Therefore, we entered the exposure variables, newspapers, radio and television news, into the regression equations separately.

Attention to cryptosporidium stories

Respondents also were asked to indicate the amount of attention they would allocate to stories about cryptosporidium if they encountered such stories in the mass media. Again, because we were interested in radio news, television news and newspapers, we created factor scores to build an index of attention to cryptosporidium news. The alpha for this index was .82, indicating acceptable reliability.

Results

The Sample

Respondents ranged in age from 18 to 92, with an average age of 44. Fifty-eight percent of the sample was female. The typical respondent had taken at least some courses beyond high school and reported an average household income of $20,000 to $30,000. About 17 percent of the sample indicated their ethnicity as other than white. As previously indicated, these demographics closely resemble those of all Milwaukee residents.

Analyses

We first created a bivariate Pearson correlation coefficient matrix for all the variables in the analyses. These correlations are contained in Table 1 and offer a look at preliminary, bivariate relationships. Among the most consistent, stronger relationships are those between a variety of variables and worry. The strongest among them is between worry and having gotten sick (.32) and between worry and attention to cryptosporidium stories in the media (.37). Also note the moderate correlation (.34) between answers to the two knowledge questions.

We tested the bulk of our hypotheses via regression analyses. To test H3, we used a paired sample t-test. A total of four stepwise multiple regression analyses were conducted. We sought to keep the two different measures of media use separate. So, for each of the two measures of explanatory complexity (how cryptosporidium got into the water supply and what it does to the body) we offer two regressions, one featuring media exposure as an independent variable and the other featuring attention to cryptosporidium stories as an independent variable. The independent variables in these four regressions otherwise remained the same.

Standardized beta weights were used as indicators of the relative importance of variables because not all variables were measured in comparable units. A probability level of $p<.05$ was used as the base level of statistical significance. The margin of error for percentages based on the entire sample in this report (95 percent level of confidence) is plus or minus 4 percent.

Knowledge gap

H1 predicted that socioeconomic status would predict complexity of both the causal explanation of where cryptosporidium came from and how it got into the water supply, and with the explanation of what it does to the body.

The correlations in Table 1 offer preliminary information. For example, although the correlations are quite small, status appears to be positively correlated with exposure to newspapers ($r = .09$, $p<.01$), yet negatively correlated with exposure to television news ($r = -18$, $p<.001$). On the other hand, the table indicates no relationship between status and attention to cryptosporidium news. Gender also is negatively correlated with status ($r = -15$, $p<.001$), indicating that the women in the sample have significantly less status than the men.

As the regressions in Tables 2 and 3 indicate, this hypothesis was supported, regardless of which media variable was entered into the equation. However, in each case, the relationships were relatively weak, with betas ranging from .15 to .19.

Motivation

H2 predicted that motivation – defined by worry and perceived likelihood, and experience – would predict to the complexity of both the causal explanation of where cryptosporidium came from and how it got into the Milwaukee water supply, and with the explanation of what it does to the body.

The bivariate correlations in Table 1 indicate that the two motivation variables, experience and worry/perceived likelihood, were moderately and positively correlated ($r = .32$, $p<.001$). Additionally, experience was positively correlated with attention to cryptosporidium news ($r = .23$, $p<.001$), and with both causal explanations ($r = .13$, $p<.001$ for each). Worry/likelihood also was moderately and positively correlated with attention to cryptosporidium news ($r = .37$, $p<.001$), and weakly correlated with both causal explanations ($r = .07$, $p<.05$ for how the parasite got into the water and $r = .11$, $p<.01$ for what it does to the body). In addition, worry/likelihood was weakly and positively correlated with exposure to television news ($r = .16$, $p<.001$).

As Tables 2 and 3 indicate, this hypothesis was partially supported. When exposure was our media variable of choice, experience served as a weak but significant predictor of the complexity of explanations for how cryptosporidium got into the Milwaukee water supply ($r = .10$, $p<.05$), but worry and perceived likelihood did not (Table 2). However, when attention to cryptosporidium news was entered as the media variable, motivation made no contribution to explanations for how cryptosporidium got into the Milwaukee water supply (Table 3).

When media exposure was again the variable of choice (Table 2), both direct experience and worry-perceived likelihood were statistically significant predictors of the explanatory complexity of explanations for what cryptosporidium does to the body ($r = .09$, $p<.05$ and $r = .10$, $p<.05$, respectively). When attention to cryptosporidium news was entered as the media variable (Table 3), neither motivation variables were significant predictors of explanations for what it does to the body.

Media impact

H3 predicted that causal explanations of how cryptosporidium got into the Milwaukee water supply would be more complex than explanations for what it does to the human body. To test this hypothesis we performed a t-test, which indicated that the hypothesis was supported ($t = 9.13$, $n=609$, $p=<.001$). Although the two explanations are correlated ($r = .34$, $p<.001$), the complexity of respondent's reflections on how the parasite got into their water supply was indeed higher than the complexity of their explanations of what the parasite does to the human body; the mean scores were 5 and 4 respectively.

H4 predicted that media use would predict to causal explanations for how cryptosporidium got into the Milwaukee water supply, but not to the complexity of explanations for what it does to the human body.

Table 1 indicates that attention to cryptosporidium news is weakly and positively correlated with explanations of what cryptosporidium does to the body to cause illness. In addition, explanations of how cryptosporidium got into the water supply are weakly and positively correlated with exposure to newspapers. However, as Tables 2 and 3 indicate, this hypothesis was not supported regardless of which media variable was entered into the equation.

Conclusions

In this study, we employed four conceptual domains – knowledge complexity, knowledge gaps, motivation and framing – to try to understand the complexity of individuals' understanding of a cryptosporidium outbreak in Milwaukee and the extent to which that complexity was linked to media use. Our goal was to explore factors that may influence the depth of people's understanding of the chain of events that led to this widespread threat to public health. The knowledge gap hypothesis proved useful, as did the literature on motivation and knowledge complexity; however our attempts to link media use to the explanations were not as fruitful.

Our most important finding is that socioeconomic status is a significant contributing factor to differences in knowledge complexity. Specifically, individuals with more education and higher incomes were more likely to produce complex causal explanations both about how the parasite entered Milwaukee's water supply and about what the parasite does to the body to cause illness. However, our results also indicate that, although the relationship between SES and knowledge complexity was significant, it was weak, leaving about 95 percent of the overall variance to be explained in our regression equations (R^2 ranged from .04 to .06). This suggests that knowledge complexity is related to other factors that were not included in this study.

The literature on cognitive complexity indicates that complexity is just that – complex. According to Fiske, Kinder and Larter (1983), political expertise, for example, is correlated with political ideology, ideological extremity and party preference, but not with confidence with and emotional reactions to general political knowledge. Given that we were specifically interested in status, motivation and media use, we did not take more belief-based factors into account. In our case, such factors may have included a variety of health beliefs and/or social beliefs.

Our findings on motivation also were consistent with the literature on cognitive complexity, which indicates that experience and involvement with a topic tend to encourage individuals to seek out information about that topic (Doll and Ajzen, 1992; Ajzen and Sexton, 1999). In two of our four regressions, experience with cryptosporidium did survive as a predictor of explanatory complexity for both how the parasite got into the water supply and what it does to the body to cause illness.

This finding is not surprising, given that experience with this particular topic meant having suffered such physical symptoms as persistent diarrhea, vomiting, painful abdominal cramping and dehydration. In the case of cryptosporidiosis, a relatively unknown illness to the general public, individuals who suffered these symptoms most likely felt a vested interest in gaining information about what was going on in their bodies and how this outbreak came to pass in the first place.

Our other motivation variable, worry/perceived likelihood, predicted explanatory complexity only with respect to what the parasite does to the body to cause illness. This finding suggests that estimated level of risk and worry about getting sick are not related to knowledge about external factors, such as how a hazardous event came to pass or who was to blame. On the other hand, perceived personal risk and worry *are* related to knowledge about one specific internal factor – how the hazardous event affects one's own body. In fact, this particular factor is likely to be the very *object* of an individual's concern about the risk: How does it affect *me*?

Interestingly, our two motivation variables fell away as predictors of explanatory complexity when attention to news about cryptosporidium replaced media exposure in the regression. This may indicate that although people who had suffered the illness were motivated to gain significantly more information about the outbreak, the rest of the population also had at least some motivation to gain at least some information about the outbreak – regardless of their general media use habits. In other words, it is possible that even individuals who generally get little of their knowledge from the media turned to the media for information about the outbreak. Indeed, when 40 percent of the greater population fell ill with a heretofore unknown parasite of initially mysterious origins, the greater population was, if not stricken by the illness, at least touched by it.

On the topic of framing, we were unable to establish that knowledge complexity was related to media use. However, the fact that people were better able to talk about how the parasite got into the water versus what it does to cause illness suggests that even in an information-rich environment, the more ubiquitous information available may have been focused on this more politically oriented explanation.

The failure of both motivation and media use predictors seems counterintuitive, given that, according to our bivariate correlations (Table 1), both motivation variables are significantly correlated with attention to news about cryptosporidium (although not to exposure). Motivation, when coupled with attention to news specifically about cryptosporidium, should be an even stronger predictor of more informed explanations. We offer two possible reasons for these conflicting results.

First, if we look closely at the wording of the question that solicited our data on attention, it asks for an indication of the amount of attention that the respondent *would* pay to news about cryptosporidium *if* he or she encountered such news. It is quite possible that intention to pay attention is not at all an indication of actually having paid attention during the barrage of information that hit Milwaukee during the outbreak. In retrospect, particularly for those who did suffer symptoms, some people may have wished that they had paid more attention to the news about the outbreak. The fact that they did not pay attention during the outbreak could cancel out any relationship between actual motivation and knowledge complexity. They *would* pay attention, but they did not.

Second, it is important to note that the information-rich environment created by the parasitic outbreak provided a potentially anomalous situation – a situation in which even those who might have ignored the news about the parasite could not escape the topic. It is likely that everyone encountered information, regardless of whether they sought it.

In other words, in a crisis situation, everyone may have been motivated to attend closely to information about the risk, a situation that would eliminate the ability of either motivation or info use to account for variance in explanatory complexity. Either or both of these explanations may account for our findings; without further analysis it is impossible to know. Of course, it is important to note here that none of our media variables appeared to be predictors of knowledge complexity. In a world of motivational and informational constancy, only individual ability to actually process and use information (measured here by SES) would then account for variance.

Although its predictors are elusive, knowledge complexity – or more specifically, complexity of causal explanations – did prove to be a useful dependent variable when looking at individuals' understanding of the chain of events that led to this widespread threat to public health. In addition to some of the beliefs alluded to above, future risk research that looks at knowledge complexity as a dependent variable may want to look more closely at education-related variables, such as formal training in science and public affairs. According to the knowledge gap research, other potential predictors may include risk-related community conflicts and beliefs about such conflicts, and potential language differences that may affect the manner in which knowledge is expressed (c.f. Ettema & Kline, 1977).

Table 1. Bivariate Pearson correlation coefficients of variables used in analyses

	Gender	Crytpto Experience	Worry/ likelihood	Exposure to TV	Exposure to papers	Attention to crypto	Crypto in water	Crypto in body
Status	-.15***	.06	-.16***	-.18***	.09**	-.02	.15***	.15***
Gender		-.03	.19***	.07*	-.08*	.14***	-.05	.02
Experience			.32***	.03	-.01	.23***	.13***	.13***
Worry				.16***	-.06	.37***	.07*	.11**
TV					.21***	.11**	.05	.02
Newspaper						-.03	.08*	-.002
Attention							.07	.13**
Water								.34***

N=477-610 (attention only measured for people exposed to media), *p<.05, **p<.01, ***p≤.001.

Table 2. Summary of hierarchical regression analyses using beta weights for variables (including media exposure) predicting explanatory complexity of how cryptosporidium got into the Milwaukee water supply and what it does to the human body to cause illness

	How cryptosporidium got into the Milwaukee water supply	What cryptosporidium does to the human body to cause illness
Demographics		
Socioeconomic status	.16***	.17***
Gender	-.04	.03
Experience with cryptosporidium	.10*	.09*
Worry/perceived likelihood of future illness	.06	.10*
Exposure to TV news	.05	.03
Exposure to newspapers	.05	-.02
Exposure to radio	-.03	.003
Multiple R	.22	.22
R^2	.05***	.05***

N=609, *p<.05, **p<.01, ***p<.001.

Table 3. Summary of hierarchical regression analyses using beta weights for variables (including attention to cryptosporidium news) predicting explanatory complexity of how cryptosporidium got into the Milwaukee water supply and what it does to the human body to cause illness

	How cryptosporidium got into the Milwaukee water supply	What cryptosporidium does to the human body to cause illness
Demographics		
Socioeconomic status	.15***	.19***
Gender	-.07	-.01
Experience with cryptosporidium	.08	.07
Worry/perceived likelihood of future illness	.05	.09
Attention to cryptosporidium news	.05	.08
Multiple R	.21	.25
R^2	.04***	.06***

N=609, *p<.05, **p<.01, ***p<.001.

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Construction of Technology Crisis and Safety:
News Media's Framing the Y2K Issue

Paper presented to the Science Communication Interest Group
at the annual AEJMC Convention,
Aug. 9-12, 2000 in Phoenix, AZ

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Construction of Technology Crisis and Safety: News Media's Framing the Y2K Issue

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Abstract

This study analyzed the Y2K coverage in the Washington Post over two-year period, paying particular attention to the framing of the Y2K computer problem. The Y2K problems was assumed to be the kind of issue which are not directly experienced by the public until it happens, news media's construction of the Y2K could have an influence on the public's awareness and perception on the problem. The result demonstrates that the number of the Y2K coverage increased over time and government was the major source of the information. Focusing on the negative consequences of the Y2K, news media could construct the Y2K problem as a hazard. And by focusing on the negative consequences on the Y2K problem, newspaper can establish and maintain the newsworthiness of the Y2K problem during the periods.

Construction of Technology Crisis and Safety:
News Media's Framing the Y2K Issue

Introduction

As we headed toward a new millennium, the Year 2000 computer bug hit the public's nerve. This challenge was called Y2K Problem. Computer experts had voiced concerns that older computers using two-digit year code might interpret 2000 as 1900 and malfunction. This misinterpretation of date would cause incorrect data process or shutdown in "many computer systems, household appliances and sophisticated manufacturing equipment" (Koskinen, 1998). Y2K problem would, however, not solely affect computer or electronic appliance but also possibly disrupt all aspect of social life (Bridis, 1999). A news report pointed out "panicked consumers who hoard cash, food, medicine and gasoline could create more severe social and economic problems than any technological failures resulting from the Year 2000 computer glitch" (Chandrasekaran et al., 1999, p. A1). In this regard, the real problems of the Y2K computer failure were its social and economic impacts. Reflecting those concerns, the so-called Y2K issue had received considerable attention in news media during 1998 and 1999.

The Y2K issue itself was unique because of the uncertainty of whether the crisis would really occur. This lack of real world clue of the issue (and public's lack of direct experience) would increase the uncertainty of the Y2K event and thus, public's perception of the seriousness of the event may solely depend on the news coverage.

Scholars suggested that media are "the public's primary source of information for disaster warnings and predictions" (Major & Atwood, 1997, p.798). Because accurate and timely information about the Y2K problem could be vital in protecting lives and property, news media's role in disseminating the Y2K information and warnings was important, and media may affect how the Y2K issues got into the public domain.

Mass communication researchers have found that the news media take part in constituting meanings for social phenomena. Media "organize the world both for journalists who report it and, in some important degree, for us who rely on their report" (Gitlin, 1980; Gamson, 1989, p.157). Some scholars have explained the media's role of construction of reality using the framing concept. Framing is "the selection of a small number of attributes for inclusion on the media agenda when a particular object is discussed" (McCombs, 1998, p.704).

This selection of a certain attributes of the issues is more prominent when the coverage is related to science, technology, and risk. "Risk communication," for example, "reflects top-down, one-way communication that attempts to bring public belief in line with expert views" (Coleman, 1995, p.65). In this regard, the Y2K problem provides an ideal issue to examine the influence of media framing on the public's awareness of social issues.

Adopting framing theory, this study examined how a newspaper constructed the Y2K issues. Specifically, this paper content analyzed the Washington Post to identify the frame of the Y2K issue. As Scheufele (1999, p.111) pointed out, news content analysis as an illustration, rather than as a rigid test of theoretical arguments, is not a shortcoming. Instead, it is an initial step towards analyzing the news process as a whole. Analyzing news content in terms of the frame presented can reveal which attributes of the Y2K issue were salient, and then may afford some advantages over elaboration of framing theories.

The Y2K Issue: Risk or Safety?

An event becomes defined as a risk "when they question, or become the basis for questioning, the taken-for-granted safety of the everyday world and our routine activities within that world" (Stallings, 1990). Specifically, "by defining and assigning considerable significance to its negative consequences" (Spencer & Triche, 1994, p.200) an event can be framed as a hazard. The Y2K event was, in many cases, characterized as one that threatens to disrupt every aspect of social life and as a potential threat to public safety.

The Y2K issue refers to the possible computer malfunction caused by the improper recognition of the year 2000 date. This issue is also called the "Y2K problem," the "Y2K bug" or the "Millennium bug" (Koskinen, 1998). The Y2K problem, more specifically, originates from many older computer systems and microprocessors that used only the last two digits of a year to keep track of the date. Due to this practice, when the year 2000 arrives, those chips may recognize 00 as the year 1900, not 2000. The resulting computer malfunctions could "cause serious disruptions of power grids, water treatment plants, financial networks, telecommunications systems, and air traffic control systems worldwide" (Koskinen, 1998). In addition to this disruption of the infrastructure, the large number of networked computers people depend on every day make the Y2K problem a serious challenge.

The Y2K experts said that this was not merely a technological problem but a social one as well. The problem hit the public's nerve because it questioned the taken-for-granted safety of the everyday world. A newspaper illustrated the public's nerve on Y2K disruption (Achenbach, 1998, p. A1):

> [Some people] are stockpiling food in the basement [or] ... in the garage. They bought a wood stove for when the power goes out. They are loaded up on Starkist tuna, Vienna sausages, dried beans and egg protein powder. They have 18 cans of Spam and ... have books: the "U.S. Army Survival Manual," "How to Hunt," [and] "Pet First Aid" (they have three dogs). They even have a book called "Creepy Crawly Cuisine: The Gourmet Guide to Edible Insects," but that's just a joke, they say. They expect Y2K to be bad, certainly, but not so bad that they'll have to eat bugs for dinner.

Facing the possibility of people's panic, for example, the Federal Reserve had taken steps to put an extra $50 billion into the banking system in anticipation of people withdrawing cash from their accounts (ibid.). Regarding its social and economic impacts, the President's Council declared that Y2K problem had been "perhaps the greatest management challenge the world [had] faced since World War II" (President's Council, 1999).

Though the technological fix was not difficult, "the entire process of identifying, fixing, and testing myriad systems and data exchange points has consumed an extraordinary amount of time and billions of dollars" (President's Council, 1999). For this reason, during 1998 to 1999 business corporations, utility companies, computer industries and governments had faced an enormous organizational and management challenge due to the sheer scale of the Y2K problems.

Federal government created task forces, such as the Council on Year 2000 Conversion and these agencies coordinated the work to identify the problem and prevent any malfunction of their computers. With the government leadership, considerable progress was made on the Y2K issue in both the public and private sectors. According to a government report, only 27% of all critical federal systems were Y2K compliant in the late 1997. This figure went up to 61% by November 1998 (The White House, 1998). As of October 1999, according to the government's Fourth Quarter Report, 99 percent of the Federal Government's 6,000 mission-critical systems were Y2K compliant. The U.S. Office of Management and Budget, acknowledged that "these systems have been tested and implemented, and will be able to accurately process data into the Year 2000" (President's Council, 1999).

Public Opinion on Y2K

During the year 1998 and 1999, public awareness of the Y2K problem had increased significantly. The Gallup poll results showed that the people who had seen or heard 'a great deal' about the problem surged from 39% in December 1998, … to 64% in August 1999 (Gallup, 1999).

The public's worries was not, however, easily changed in spite of the wide range of governments' campaign to educate the public not to panic on the possible computer malfunctions. During the 1998 and 1999 the public's perception of the seriousness of the

Y2K bug had been divided. To the question asking the degree of "personally" perceive risk due to the Y2K bug, 59% of people responded it would cause either "major" or "minor" problems, but 40% answered "no problem at all" (Gallup, 1999).

This poll showed many people believed that the Y2K bug would probably disrupt their lives. Even analysts were not sure whether these failures would be a mere annoyance, or possibly a clear risk that electricity, telecommunications and other key systems fail, perhaps creating economic havoc and social unrest (Bridis, 1999).

In this context, some people who worried about the problem considerably built "arks" and digging ditches in preparation for the disaster (Achenbach, 1998), while others foresaw that inconveniences, such as electrical brownouts and breakdowns, would be minimal and temporary (Chandrasekaran, 1999). Even a government report forecasted some inconveniences would occur. The government's Fourth Quarter Report pointed out that:

> [T]here is no question that, despite the most well-intended efforts, systems will experience difficulties related to the date change, especially in organizations that have done little to prepare. It is also worth noting that not every Y2K problem will be evident on January 1. Difficulties in systems that are not Y2K ready may not surface until days or weeks after the date change (President's Council, 1999).

The truth was that "no one really knows"(Barr, 1999, p. A17) what would happen.

Even people could not understand what the actual problem was because it was originally forecasted in technological terms by computer experts (Behr, 1999, p. A7). A report on Y2K said that "[o]nly trained computer programmers or the otherwise technically astute can truly evaluate the severity of the [Y2K] crisis" (Computing the millennium, 1998). Due to this "unobtrusive" nature of the event (Yagade and Dozier, 1990), the media had to translate the "engineers' words"(Behr, ibid.) into mundane terms for the public. Typically, citizens would receive much of their general knowledge about Y2K problem from the mass media.

According to some communication scholars, unobtrusive issues which are "those not directly experienced by individuals" are more likely to affect an individual than obtrusive ones (Yagade and Dozier, 1990, p.4). Because the Y2K problems was assumed to be the kind of issue which are not directly experienced by the public until it happens, news media's construction of the Y2K could have an influence on the public's awareness and perception on the problem. In this regard, knowing how the news media framed the issue is an important matter.

Media Framing

The concept of media framing has important implications for the public's opinions and attitudes (Menashe and Siegel, 1998, p.310). A media frame is "a central organizing idea for news content that supplies a context and suggests what the issue is through the use of selection, emphasis, exclusion and elaboration" (Gamson, 1989; McCombs et al., 1998, p.704). Thus, the concept of frame is considered be useful in understanding the journalistic process from the identification of news values to the reporter's tendency to select and interpret information.

This notion of frame was clarified by Entman (1993). He defines frames in terms of their selection and salience properties. To frame is, he explains, "*to select some aspects of a perceived reality and make them more salient in a communication text, in such a way as to promote a particular problem definition, casual interpretation, moral evaluation and or treatment recommendation for the item described*" (p.52, italics original).

Frames, according to Entman, help individuals interpret reality by paying more attention (selection) to specific aspects of it and subsequently making them more prominent (salient). What the selection and salience properties seek to activate is the execution of the four specific functions of frames: problem definition, diagnosis, evaluation and prescription. Entman's cold war frame, for example, described those four functions: The cold war frame highlighted certain foreign events as problems, identified their source, diagnose the forces creating the problem, offered moral judgments, and commented on a particular solution (Entman, 1993, p.52).

Previous framing studies, also, show newspaper can frame risk and safety by assessing negative consequences of the event and identifying its causes (Spencer & Triche, 1994). Especially, events can be defined as hazard by news media when undoubted "safety of the everyday world and routine activity" is at risk. Kates and Kasperson (1983) argued "by defining and assigning considerable significance to its negative consequence, an occurrence can be framed as a hazard" (as cited in Spencer & Triche, 1994, p.200). News frame can encourage the public perceiving the event to develop particular understandings of the event. By focusing on the negative consequences of the problem, news media could construct Y2K issue as a hazard.

In sum, a frame is "a way of packaging and positioning an issue so that it conveys a certain meaning" (Entman, 1993; Iyengar, 1991). Scheufele (1999, p.107) also argued "the framing and presentation of events and news in the mass media can thus systematically affect how recipients of the news come to understand these events." In this perspective, "framing is closely related concept to agenda setting or priming" (Iyengar & Kinder, 1987; Scheufele, 1999, p.103). McCombs et al. (1997), also, suggested that "not only are agenda setting and framing effects related, framing is, in fact, an extension of agenda setting"(Scheufele, p.103).

Framing theory suggests, however, that media's influence over public opinion involves more than agenda-setting and gatekeeping functions. Scheufele (1999) pointed out "two aspects of Entman's definition are especially important for differentiating framing as a media effect from approaches like agenda-setting or gatekeeping: selection and salience" (p.107). Whereas gatekeeping and agenda setting researches have commonly examined the selection and salience of issues, framing studies focus on the nuances or *particular aspects* of coverage within an issue.

By framing issues in certain ways, the media influence the way people perceive a problem or issue and its consequences. Because news takes the role of a frame through which people learn about the world, how the news media cover an issue is important.

Methods

Content Analysis Design

This research analyzed the content of all news articles related Y2K problem that appeared in the Section A of the Washington Post. The newspaper was chosen because it is published in the nation's capital and is recognized as one of the preeminent newspapers which set the national agendas in the U.S. The time period studied was February 1, 1998 to October 31, 1999 because Y2K issue received considerable attention during the period.

For purposes of this study, the Y2K issues were defined as news items relating to possible malfunction of the appliances, electronic equipment and networking due to computer's misinterpretation of date and ones portraying any possible disruption in social, economic and institutional levels because of the malfunction.

Computerized Content Search. This study used computerized database to search Y2K issue-related stories. The computerized sampling was done by two steps.

In the first step, the author searched for news articles in the Washington Post using a newspaper database, *ProQuest* (UMI). The search was limited to the section A of the Washington Post, which covers major national and international news stories. All type of stories such as feature, news analysis, and opinion and editorial in section A were included.

The words used were "Y2K," "year 2000," "millennium," "problem," "bug," "computer," "compliance" or "disruption." Any possible combination of the first three words and the latter five words were searched. For example, "Y2K problem" or "millennium bug" is a possible combination of those words. The search rendered 159 news stories that fit these inclusion criteria.

In the second step, the author excluded from the analysis articles where Y2K event was a merely passing issue or the briefed report. Those excluded were "Washington in brief," "Today in congress," "Correction," "Clarification," and bill enactment-related stories.

Because the ProQuest service offers both abstract and full text of each news article, this filtering process was done using the newspaper abstracts. After evaluating each identified story for these exclusion criteria, 96 articles were remained. These articles represented the final sample for this study.

Data. The coding unit was the individual story about Y2K problem. Using ProQuest newspaper database, each story was coded into four variables: news source, areas of concern, evaluation, and episode.

The 'news source' variable consists of two categories, *governmental sources* such as government agencies, military, Congress, or state/local government, and *non-governmental* sources.

The 'areas of concern' variable was defined as the area where the Y2K problem involved. This variable may also suggest the actor who was in charge of solving the Y2K problems. It consists of four categories: *government-related, public service industry related, other business/industry related* and *international issues*.

The 'episode' variable identified what kind of Y2K problem the coverage mentioned. The variable consists of four categories: 1) *Government function disruption* category includes all stories that portray any possible disruption in any level of governments' or government agencies' normal function; 2) *Public service or business disruption* category includes all stories that mention any possible disruption in normal supplies of food, water, electricity, telecommunications, transportation, healthcare, education (school), and in normal business of banks or product suppliers; 3) *Foreign disruption* category includes all stories related to any possible problem in international context; and 4) *Effort to* *prevent disruption* includes all stories related to any effort to fix systems and compliance test.

And finally, the 'evaluation' variable was defined as the degree of the seriousness of the Y2K risk which was suggested in the news coverage. This variable has six categories: *crisis likely, minor disruption possible, no crisis at all, no sure,* and *neutral reportage*.

Reliability. In preliminary coding, 20 stories were randomly chosen and coded by two journalism graduate students, include the author. Discrepancies were identified and resolved on a case-by-case basis by either modifying the analytic scheme or changing one or the other's codings. Then the coders independently coded approximately one-half of the data and then compared the results. A 10 % sample was recoded to determine inter-coder reliability. The average inter-coder reliability was 89%.

Research Questions

Given the importance of the Y2K issue framing, it is important to identify the major frames that had been used by newspapers in organizing public awareness and preparing emergency measures. The purpose of this research is to determine how the Washington Post framed the Y2K computer problem during 1998 and 1999. Research questions guiding this study are as follows:

RQ1: How much coverage did the Washington Post give to the Y2K problem?

What was the monthly distribution of articles?

Did the amount of coverage change over time?

RQ2: How did the Washington Post frame the Y2K problem?

From which source did the Washington Post get the Y2K news?

Which areas did the coverage concern?

Which Y2K events received coverage?

How did the news stories evaluate the seriousness of the problem?

How had the evaluation of the problem changed over time?

Analysis

Answering Research Question 1

The data for this study consist of news reports appearing in a national daily newspaper, the Washington Post, during a 21-month period. A total of 96 articles, published between Feb. 1, 1998 and Oct. 31, 1999 that contained references to the Y2K problems, were included in the analysis. Figure 1 illustrates the number of coded stories for the 21-month period. It shows the number of stories steadily increased from 1998 to 1999.

To find more discernible trends in the distribution, the data were divided into three seven-month sub-periods. The first dividing point was March 31, 1999 that was the federal government's self-imposed deadline for ensuring all critical federal systems Y2K compliant (The White House, 1998). The rest 14 months were simply divided by two. August 31, 1998 was the second dividing point.

<Figure 1> Monthly distribution of the Y2K stories

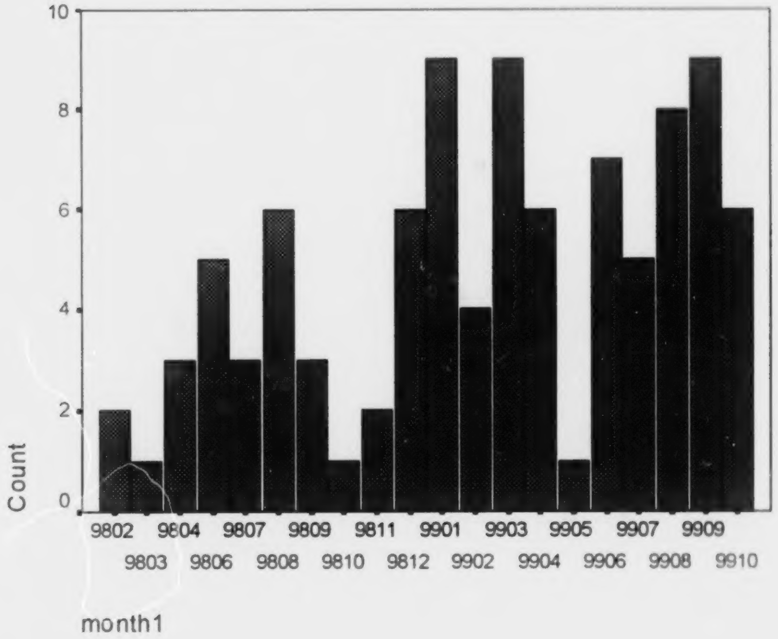


Table 1 and figure 2 shows the number of the Y2K stories in three sub-periods. The trend showed that the frequency of stories was increasing over time. The Goodness-of-fit test shows this relationship between three time-periods and the number of stories was, also, statistically significant ($\chi^2 = 7.75$, df = 2, $p < .01$).

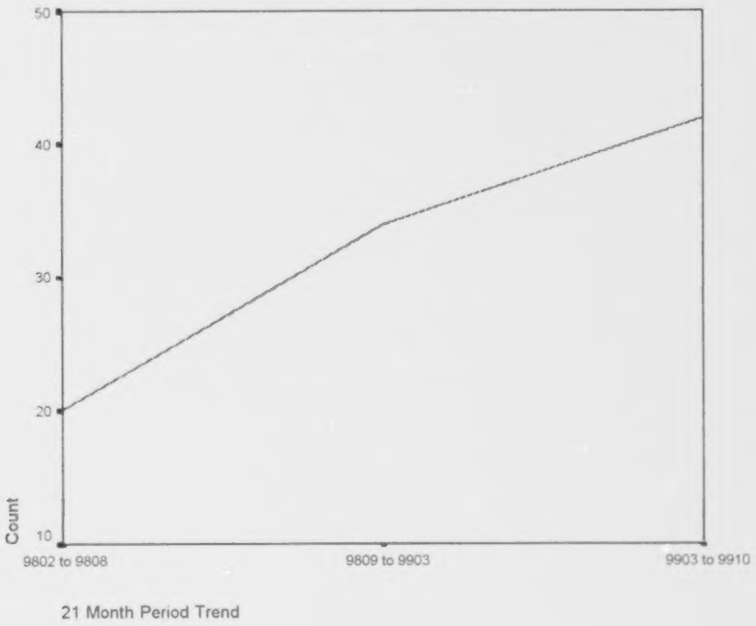
<Table 1> Number of the Y2K stories in three sub-periods

		Number of Stories
Period 1	(Feb. 1998 to Aug. 1998)	20 (20.8%)
Period 2	(Sep. 1998 to Mar. 1999)	34 (35.4%)
Period 3	(Apr. 1999 to Oct. 1999)	42 (43.8%)
Total		96 (100 %)

($\chi^2 = 7.75$, df = 2, $p < .01$)

During February 1998 to August 1998 only 20 (20.8%) stories were covered in the Washington Post. This figure increased up to 34 (35.4%) during September 1998 to March 1999. Interestingly enough, the number of stories on the newspaper was increased after the government's self-imposed deadline passed. A 43.8 percent of all the Y2K stories analyzed was covered during the final period (April 1999 to October 1999).

<Figure 2> Trend in the number of the Y2K stories



Answering Research Question 2

To answer the question how the Washington Post framed the Y2K problem, this study examined news stories on the basis of four attributes, news source, areas of concern, episode and evaluation.

Entman (1991) identified agency (news source) as one of the five traits of media text which have a critical impact on information processing. Other scholars also suggested news sources as an important factor in media's definitions of risk (Fishman, 1980; Spencer & Triche, 1994). The content analysis showed that about 83 percent (n=80) of all stories was relied on the information from governments. Only about 17 percent (n=16) was based on non-governmental sources. This distinction was also statistically significant ($\chi^2 = 42.67$, df=1, p< .01). Table 2 illustrates this distinction.

<Table 2> News Source

	Frequency
Governmental Sources	80 (83.3%)
Non-governmental Sources	16 (16.7%)
Total	96 (100 %)

($\chi^2 = 42.67$, df=1, p< .01)

In framing the Y2K issue, the areas of concerns are also an important attribute. The areas of concern can also suggest who will be the main actor in solving the Y2K problems. Table 3 shows a distribution of the area of concern. Over the 21-month period, governments related subjects were the most frequently covered area of concern. About 45 percent (n=43) of all stories concerned government-related issues. About 29 percent (n=28) concerned public service industry such as telecommunications, utilities, and hospital. Other business/industry-related issues and international issues received relatively low coverage, 11.5% and 14.6%, respectively. This differences in frequencies were also statistically significant ($\chi^2 = 26.92$, df=3, $p < .01$). This pattern reflects the considerable amount of government effort in solving the Y2K problems.

<Table 3> Areas of concern

	Frequency
Government-related Issues	43 (44.8 %)
Public service industry-related	28 (29.2 %)
Other business/industry-related	11 (11.5 %)
International Issues	14 (14.6 %)
Total	96 (100 %)

($\chi^2 = 26.92$, df=3, $p < .01$)

The content analysis of episodes illustrates the events the Washington Post defined at risk. The data showed that about 45 per cent of all the stories was devoted to the efforts to prevent disruptions, such as computer testing procedures and developing contingency plans. With the exception of the episode of preventive actions, public service industry or other business area was reported being at-risk (28%). 14.6 per cent stories reported the Y2K problem at international level. The difference in frequencies was statistically significant ($\chi^2 = 25.83$, df=3, $p < .01$). Because framing is the selection of a small number of attributes for inclusion on the media agenda (McCombs, 1998, p.704), the episode selected in the newspaper is an important factor in assessing the newspaper's construction of the Y2K problem. This result suggests that the possible disruption in public or private business was covered more than other areas of disruption because it is closely related to the take-for-granted safety in the public's everyday life. Table 4 shows frequency distribution in newspaper episode.

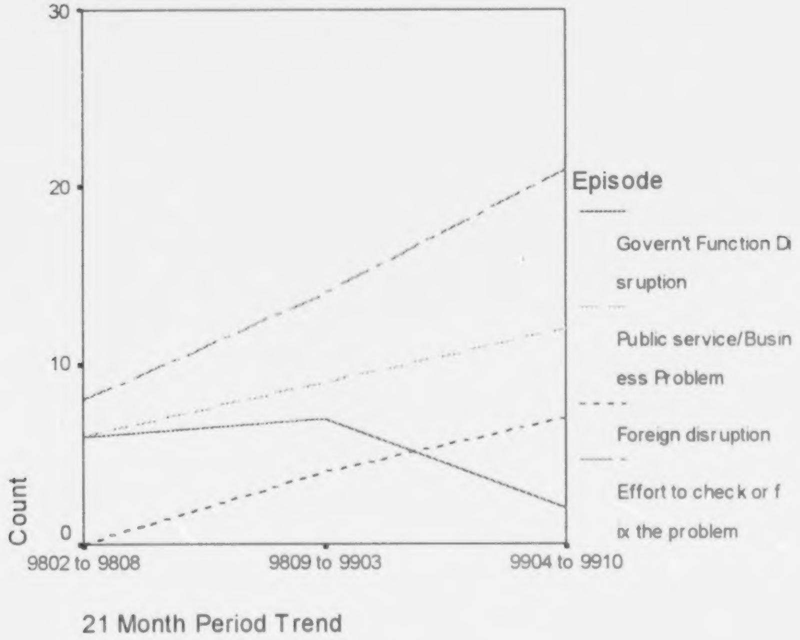
<Table 4> Episode

	Frequency
Disruption in governments function	15 (15.6 %)
Disruption in public service or other business	27 (28.1 %)
Disruption in foreign country	11 (11.5 %)
Effort to prevent disruption	43 (44.8 %)
Total	96 (100 %)

(χ^2 = 25.83, df=3, p< .01)

The distribution of episodes had also changed over time. It is worth noting that the number of stories concerning disruption in governments' function increased during February 1998 to March 1999, but after that it decreases considerably, while the other three episodes continuously increase. The episode about the disruption in governments' functions might be lost its newsworthiness because the federal government declared that, 97% of all critical federal systems became Y2K compliant by the end of the deadline (March 31, 1999). Figure 3 illustrates this trend over time.

<Figure 3> Changes in Episode Selection



Finally, Table 5 shows the distribution of the evaluation of the seriousness of the risk that was suggested in each story. For the 21-month period, about 43 percent (n=41) of the stories suggested 'crisis is likely to happen.' On the other hand, 22.9% (n=22) of the stories forecasted 'no crisis at all.' 28.1% of the stories was ether neutral (n=14) or waived evaluation (n=13).

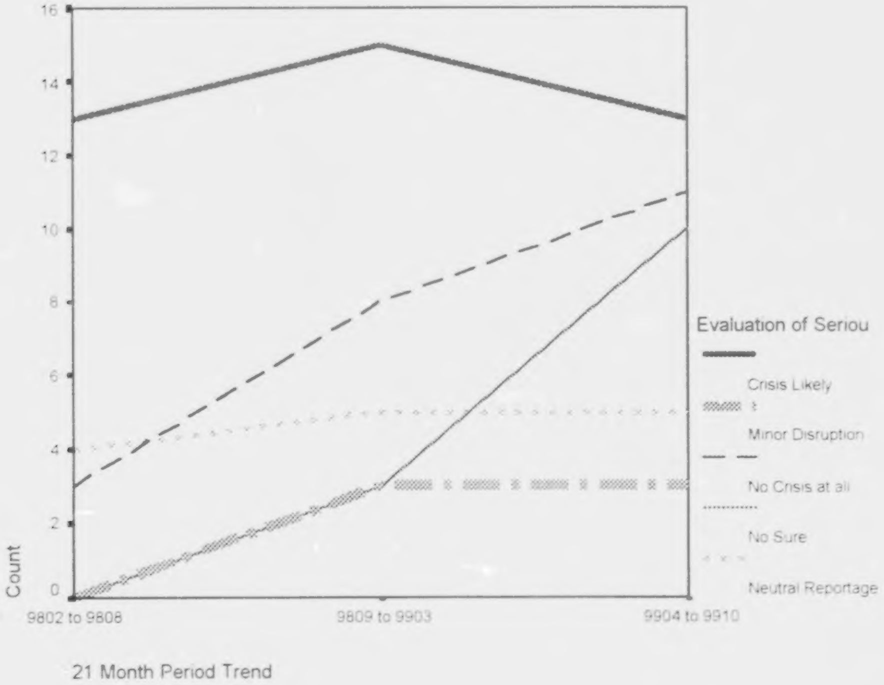
<Table 5> Evaluation of the Problems: Will Crisis Come?

	Frequency
Crisis will happen	41 (42.7 %)
Minor disruption	6 (6.3 %)
No Crisis at all	22 (22.9 %)
No sure	13 (13.5 %)
Neutral Reportage	14 (14.6%)
Total	96 (100 %)

(χ^2 = 37.65, df=4, p< .01)

The evaluation on the Y2K problem has also been changed over time. Figure 4 shows the trend in evaluation. Because the government agency declared that 97% of all critical federal systems were Y2K compliant as of March 31, 1999, it could be expected the frame of evaluation to be changed. After the government declared its successful job on the Y2K problem, the worry about crisis/disruption gradually decreased. But the worry of crisis had been the most frequently suggested evaluation by the newspaper over all time periods. On the other hand, evaluating the Y2K as 'safe' increased over time. In addition, the number of stories in which evaluation was bi-directional (equal possibility of crisis and safety) increased as time passed. This trend demonstrates that media still framed the issue to be uncertain, even after the government's declaration of its successful effort to solve the problem. Neutral reportage remains almost constant.

<Figure 4> Changes in evaluation



Discussion

The purpose of the present study was to analyze how the Washington Post framed the Y2K issues. Because the Y2K problems was assumed to be the kind of issue which are not directly experienced by the public until it happens, news media's construction of the issue could have an influence on the public's awareness and perception on the problem.

One of the most interesting findings of the present study was the number of news coverage had increased over time even though the possibility of having disruption was decreasing. In addition, although stories featuring the Y2K as risk had decreased over time, overall evaluation remained bi-directional. Even after most of the problems had been declared as being resolved by the government, considerable number of news stories still forecasted possible disruptions in some areas. This suggests that it might be a strategic choice for mass media to avoid loosing credibility if the Y2K disruption would happen in the year 2000.

When we consider the argument that newspaper descriptions can provide interpretive frames for understanding and explaining the Y2K problem event, this trends could have affected the public's evaluation on the Y2K risk as shown in the Gallup poll (Gallup, 1999). As shown in the above, during the 1998 and 1999 the public opinion about the seriousness of the Y2K problem had been divided. Gallup poll showed many people believed that the Y2K bug would disrupt their lives even at the end of the year 1999.

The results, also, demonstrates that most of the Y2K stories were relied on the information from governments. This confirms Coleman's argument that risk communication reflects top-down, one-way communication that attempts to bring public belief in line with expert views (1995, p.65). As Spencer and Triche(1994) pointed out "the news media's reliance on one particular news source may privilege one set of definition over other, competing, definitions" (p.201), this heavy reliance on governmental source was a reflection of the strong governmental leadership in solving the Y2K problem.

Another important finding is that about a half of episodes that the newspaper had chosen to framed the Y2K was 'disruption in governments function' and 'disruption in public service industry or other business.' This result confirms previous findings (Kates & Kasperson,1983; Spencer & Triche, 1994, p.200) that by defining and assigning considerable significance to its negative consequence, an occurrence can be framed as a hazard. Focusing on the negative consequences of the Y2K, news media could construct the Y2K problem as a hazard. This focus on negative consequences on the Y2K problem also served to establish and maintain the newsworthiness of the Y2K problem during the periods.

Finally, present study has several limitations. It did not prove media's framing effect on audience's opinion. Future research could find this framing effect on the public opinion on the Y2K issue. Another limitation comes from the method used in this study. Concerning computer-based content analysis Krippendorff (1980) suggested that "the computer's ability to process textual material reliably has been convincing to many content analysts. It virtually eliminates human error and the effort of developing reliable coding instructions" (p.120). But this new sources of content and alternative to human coding raise new questions about data representativeness, reliability and validity (Riffe & Freitag, 1997, p.879). In this regard more careful design should be developed in future studies.

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The Visual Presentation of Expertise:

Y2K Experts on Television

(revised 6/10/00)

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Presented at the
2000 AEJMC Convention,
Science Communication Interest Group

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ABSTRACT:

The recent Year 2000 Computer Problem (Y2K) offers a relatively contained event within which we can examine the construction of expertise. Using conversation and visual analysis this paper surveys the ways in which images of technical expertise were constructed on U.S. television. Drawing on an innovative method for computer-aided television archiving, the study treats an unprecedented range of programming, from "high culture" media like network television news to "low culture" media such as daytime talk shows.

The Visual Presentation of Expertise:
Y2K Experts on Television

The recent Year 2000 computer problem (or Millennium Bug, as it was popularly dubbed) offered a unique chance to analyze the construction of technical expertise with regard to a specific crisis. Throughout 1999, the potential failure of computers loomed large in the public consciousness, fueled in large part by frequent references to Y2K in the mass media. Technically speaking, the problem was simple: programmers had often used two digits to store dates rather than four. Thus, when the year changed, many computers would read the two-digit date "00" as "1900" rather than "2000." While simple in programming terms, however, the implications of the Millennium Bug were remarkably complex. Nobody seemed to know exactly what might happen when the rollover happened, and predictions ranged from non-existent to apocalyptic.

As 1999 progressed, Y2K was increasingly seen as a matter of public safety, a possible crisis about which the public needed to be educated. For a time, it seemed like the media were full of talking heads, experts offering one opinion or another about whether the world was going to end, and what the public ought to do to prepare.

Needless to say, prophecies of doom failed to be realized, and the world went about its business on January 1. After some scattered argument over whether it had been necessary to spend so much money, the Y2K experts dropped off the public radar, and the media moved on. However, a look back at the ways Y2K showed up in public discourse can offer some interesting insights into the ways expertise is constructed and deployed in the context of a technical threat.

In recent years, some research under the umbrella of "Public Understanding of Science" has taken a cue from the sociology of scientific knowledge, shifting its focus from the question of how to teach the public more science to a more nuanced investigation of the nature of the public itself (see for example Irwin and Wynne, 1996).

Such studies reject the traditional "deficit" model of scientific and technical communication, which describes a unidirectional flow of information from expert to lay person, in favor of a more balanced picture that takes into account local knowledges.

An important finding of these sociological studies of science and the public is the mutual construction by both parties of the boundary separating experts (who have privileged access to information) from members of the lay public (who possess no such information). When they conflict with experts over technical matters, members of the public will frequently defer to the experts and withdraw, citing a basic inability to understand and engage with technical matters (Michael 1996; Wynne 1996).

I argue that in order to better understand the gap between science and public in modern society, more attention needs to be focused on the media that inform our daily lives. For the most part, work in this vein has been quite unbalanced - the vast majority of analyses of science and technology in the media have dealt with the print media, overwhelmingly print journalism. In large part, this is due to the relative ease of working with electronically indexed newspaper and magazine articles; it is the "most efficient way, in terms of time and money, to study a mass medium" (Gregory and Miller 1998, p. 105).

This emphasis on the printed page has resulted in the neglect of other media, in particular television. It has been argued that the primary shaper of American attitudes and culture is broadcast television, our "dominant story-telling medium" (Shanahan and Morgan 1999), yet its role in the public communication of science and technology remains relatively unexplored. A few studies of science on television have been done (see for example Collins 1987; Hornig 1990; Steinke 1997; Steinke and Long 1996), but nothing in the PUS literature seems to have been written specifically on the depiction of expertise, or the playing-out of the expert-public relationship on television.

Television analysis itself presents several problems for a researcher. For one, television research has always been highly labor-intensive - if you wanted to describe references to science in a given day of programming, somebody would have had to watch that entire day's worth of television. The easy way around this problem is to use transcripts collected in online databases, which are searchable and thus much more manageable. Unfortunately, such methods condense television down to its textual content, which ignores the visual and auditory aspects of television (which are as fundamental to the meaning of a given program as what is said).

In order to get past some of these problems, for this study we made use of several computers, each equipped with a video/TV tuner card and closed captioning decoder. Three computers were used, one each monitoring NBC, ABC, and CNN.[1] Each computer recorded the programming on a given network in 15-minute blocks[2], as well as the closed captioning (a rough textual transcript broadcast with most US network programming for the benefit of the hearing-impaired, among others) accompanying those 15 minutes.

At the end of each 15 minutes, a computer program searched the caption log for certain keywords relating to the Y2K problem.[3] When a keyword hit was noted, the computer saved both the block of video and its captioning to its hard drive. In addition, a full transcript of the day's captioning was also saved at the end of each day, with each line time-stamped with the day, hour, and minute it was broadcast. Periodically, both video and caption log files were archived onto CD-ROM.

Data collection was done for a six-month period, from August 1, 1999 through January 31, 2000. In total, about 590 hours of video containing 2363 discrete references were saved, filling some 350 CD-ROMS.[4]

For this analysis, I'm following recent studies of the construction of expertise that use conversation analysis to analyze the construction of an expert identity. One particular line of inquiry has followed the construction of the "doctor" and "patient" roles, through conversation analysis of medical consultations (see Roberts (1999) for a god example of such research, as well as for a survey of prior work in the field).

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[1] The CNN machine switched over at 11:30 to monitor late-night programming on CBS.

[2] The television signal was recorded at ¼ broadcast resolution using the on-board hardware compression of ATI's All-in-Wonder Pro video card. The resulting video, albeit a bit grainy, was quite sufficient for this survey.

[3] Keywords included (case-insensitive): "Year 2000 problem," "Year 2000 computer," "Year 2000 Bug," "Millennium Bug," "Millennium Computer," and "Y2K."

[4] For more details of this project, see http://projects.sts.cornell.edu/Y2K/index.htm.

More directly bearing on the construction of expertise on television are a series of studies of news-interview discourse that chart the identity-construction of both interviewer and interviewee.[5] For example, Clayman (1992) uses a conversation analysis of several news interviews to describe the ways in which the neutral identity of the journalist-as-interviewer is created. He describes the ways in which specific tactics like self-repair and the attribution of opinion statements to a third-party allow the interviewer to put himself or herself forward as impartial with regard to the interviewee, even when explicitly attacking the interviewee's position. What's even more striking is that the interviewee is complicit in this activity - both interviewer and interviewee are responsible for the mutual construction of the journalist's neutrality.

While the analysis of the conversational maneuvering of individuals is very revealing, this research has tended to diminish the importance of the non-linguistic aspects of identity-construction see Hall (1966). While Roberts acknowledges that the doctor visits she analyzes took place within a specific setting, she notes "although this visual picture was helpful for me…it does not play a central role in this work" (Roberts 1999, p. 23). Moreover, the visual is a crucial aspect of television, as responsible for the production of an interviewee's identity as the words being spoken. Television is a visual medium, which is not merely heard, but *watched*. In addition to the conversational grammar with which conversation analysis engages, there is a layer of visual rhetoric that helps to construct meaning for those television, serving as a Goffman-esque "frame" (Goffman 1974) through which the onscreen action is filtered. The way that a given subject is filmed can have a dramatic impact on the viewer's impression of him or her - if a person is shot from below, she seems strong and imposing, while a shot from above may make her seem small and powerless.[6]

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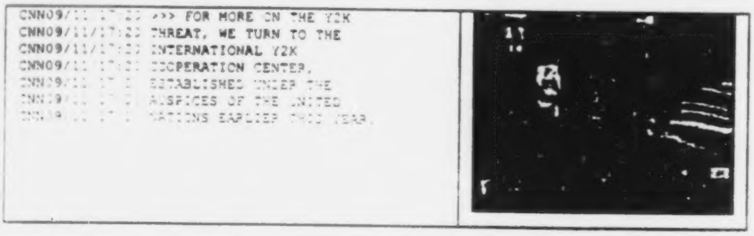
[5] See for example (Clayman 1992; Greatbatch 1992; Heritage 1985; Roth 1998).

[6] I don't mean to claim that this grammar is a universal that is inherent in the structure of the medium - it is a cultural product, and we as television viewers are socialized into it. However, for the sake of this argument, I take this visual rhetoric *a priori*, and consider myself as an analyst as having been socially conditioned to understand its meaning.

This study will focus primarily on the visual rhetoric of televised conversations about Y2K, while exploring the ways in which both the conversational and the visual construct various forms of expertise (and ignorance) on television.

First, I'd like to discuss what we might call a *technical expert dyad*, by which I mean an exchange between an interviewer and an interviewee who possesses technical expertise on a given subject.[9] I define "technical expertise" as a privileged access to information that is identified as inaccessible to non-experts. This definition of technical expertise resonates with Michaels' description of lay views of scientific knowledge as imposing and inaccessible to all but scientists. The relationship between interviewer and technical expert as played out within a conversation is defined by an imbalance of knowledge between the two, resulting in a unidirectional flow of information from the expert.

The conversation in such cases follows a very simple Question & Answer format, and was found often throughout the video surveyed. Consider the following representative exchange:[10]



CNN09/11/17:22 >>> FOR MORE ON THE Y2K
CNN09/11/17:22 THREAT, WE TURN TO THE
CNN09/11/17:22 INTERNATIONAL Y2K
CNN09/11/17:22 COOPERATION CENTER,
CNN09/11/17:22 ESTABLISHED UNDER THE
CNN09/11/17:22 AUSPICES OF THE UNITED
CNN09/11/17:22 NATIONS EARLIER THIS YEAR.

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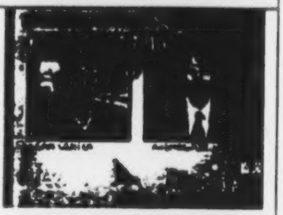
[7] Tuchman offers a discussion of some of the visual aspects of television news in Chapter Six of *Making News* (Tuchman 1978). For more information on visual analysis in general, see for example (Monaco 1981).

[8] It's worth explicitly stating that this is fundamentally a qualitative survey, rather than a rigorously scientific study. The examples that follow are intended as representative of broader trends across the archive surveyed.

[9] Throughout my analysis, I'll use the terms "interviewer" and "interviewee" unproblematically, relying on contextual knowledge about the particular interactional setting in applying these labels.

[10] Throughout this paper, video transcripts are presented in a hybrid form, with the closed captioning transcript of a given camera shot appearing alongside a representative frame of that shot. As the camera shots discussed are relatively static, this format offers a relatively complete representation of both the textual and visual aspects of the video being discussed.

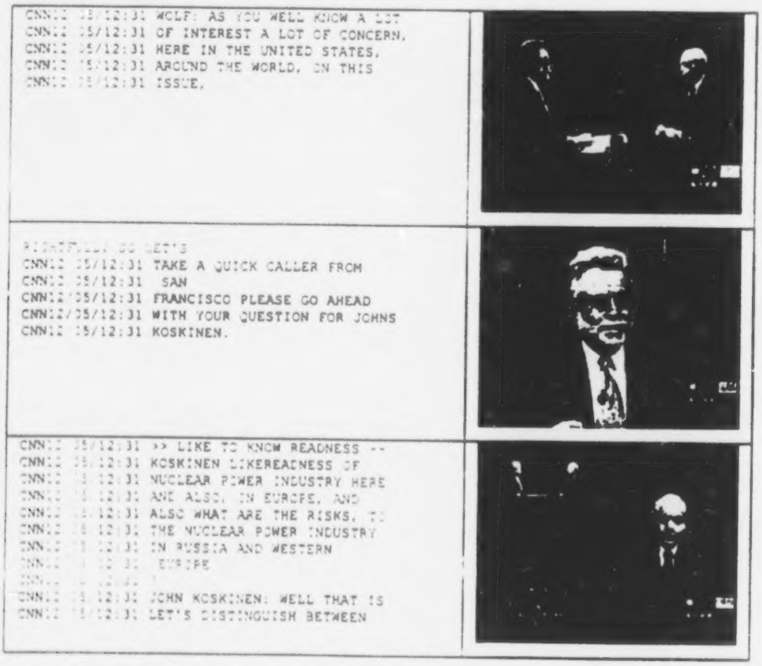
CNN09/11/17:20 BRUCE MCCONNELL IS THE CNN09/11/17:20 CENTER DinterviewerECTOR. CNN09/11/17:20 HE JOINS US FROM WASHINGTON. CNN09/11/17:20 THANKS FOR BEING HERE. CNN09/11/17:20 >> THANK YOU. CNN09/11/17:20 >> OF COURSE WE FINALLY GOT CNN09/11/17:20 PAST THE 9-9-99 HURDLE BIG CNN09/11/17:20 QUESTION IS WERE THERE CNN09/11/17:20 PROBLEMS AT ALL, AND WHAT CNN09/11/17:20 DID WE LEARN?	
CNN09/11/17:20 >> WE ARE HEARING OF A FEW CNN09/11/17:20 ISOLATED PROBLEMS, HERE AND CNN09/11/17:20 THERE, IN SOME FINANCIAL CNN09/11/17:20 SYSTEMS, WHICH, STOPPED CNN09/11/17:20 WORKING, AND I THINK THAT IS CNN09/11/17:20 WHAT WE EXPECTED WE EXPECTED CNN09/11/17:20 ISOLATED PROBLEMS, WHICH CNN09/11/17:20 PEOPLE ARE ADDRESSING BUT CNN09/11/17:21 AND SO THAT WE CAN BE CNN09/11/17:21 CONFIDENT BUT NOT COMPLACENT.	Bruce McConnell
CNN09/11/17:21 ANDRIA: WE HAVE MADE, MUCH CNN09/11/17:21 ADO ABOUT THIS IN UNITED CNN09/11/17:21 STATES BUT EXPLAIN TO US, CNN09/11/17:21 WHY IT IS SO IMPORTANT, THAT CNN09/11/17:21 WE DISCUSS THE Y2K ISSUE, CNN09/11/17:21 FROM A GLOBAL CONTEXT. CNN09/11/17:21 >> WELL, IT IS INTERESTING.	
CNN09/11/17:21 BECAUSE WE ARE ALL TIED CNN09/11/17:21 TOGETHER IN THE GLOBAL CNN09/11/17:21 ECONOMY, SO WE ALL DEPEND ON CNN09/11/17:21 EACH OTHER WE DEPEND ON EACH CNN09/11/17:21 OTHER FOR COMMUNICATION, WE CNN09/11/17:21 DEPEND ON THE WORLD CNN09/11/17:21 FINANCIAL FLOWS WE DEPEND ON CNN09/11/17:21 EXPORTS IMPORTS, AND CNN09/11/17:22 INTERNATIONAL MARKETS, SO CNN09/11/17:22 THE WHOLE THING HAS TO WORK CNN09/11/17:22 TOGETHER.	Bruce McConnell

The conversational turn-taking structure of this segment is very basic: interviewer introduces expert, interviewer asks question, expert responds, interviewer asks another question, expert responds, etc. The questions asked deal in some way with the technical functioning (or malfunctioning) of global computer systems, with the interviewer asking specifically for the expert to "explain to us" why this topic is important (italics mine). The main thrust of the conversation is the transmission of information from Bruce McConnell (as an expert on international Y2K problems) to the interviewer, and thus implicitly to us as viewers.

The sequence of camera shots serves to reinforce this unidirectional flow of information. The visual sequence begins with a shot of the interviewer, directly addressing the audience, describing how "we" are about to turn to an expert for more information. Upon the mention of the expert's name, he appears in a split-screen shot with the interviewer, who proceeds to ask a question. As the interviewee responds, the interviewer disappears from the frame - the expert seems to be speaking directly to us. The interviewer reappears in split-screen to ask another question, and then disappears again. This sequence continues for the rest of the interview.

The editing of the scene parallels the conversational turn-taking, with each cut corresponding to a new conversational turn. Visually, the interviewer only appears in a two-shot with the expert (corresponding with an interviewer question), while the expert gets the screen all to himself in a close-up while he speaks.[11] Augmenting the conversational status of the interviewer (who serves only to elicit answers from the expert), this visual rhetoric seems to clearly privilege the expert over the interviewer.

While this relationship between interviewer and expert was the most common in the "hard news" programming within the data surveyed, such a visual imbalance doesn't just apply to news interviewers. For example, in a segment of CNN's "Late Edition" aired on December 5, a member of the viewing audience calls in to ask a question of John Koskinen, the Clinton administration's "Y2K czar":



CNN12 05/12:31 WOLF: AS YOU WELL KNOW A LOT
CNN12 05/12:31 OF INTEREST A LOT OF CONCERN,
CNN12 05/12:31 HERE IN THE UNITED STATES,
CNN12 05/12:31 AROUND THE WORLD, ON THIS
CNN12 05/12:31 ISSUE,

RIGHTFULLY SO LET'S
CNN12 05/12:31 TAKE A QUICK CALLER FROM
CNN12 05/12:31 SAN
CNN12/05/12:31 FRANCISCO PLEASE GO AHEAD
CNN12/05/12:31 WITH YOUR QUESTION FOR JOHNS
CNN12 05/12:31 KOSKINEN.

CNN12 05/12:31 >> LIKE TO KNOW READNESS --
CNN12 05/12:31 KOSKINEN LIKEREADNESS OF
CNN12 05/12:31 NUCLEAR POWER INDUSTRY HERE
CNN12 05/12:31 AND ALSO, IN EUROPE, AND
CNN12 05/12:31 ALSO WHAT ARE THE RISKS, TO
CNN12 05/12:31 THE NUCLEAR POWER INDUSTRY
CNN12 05/12:31 IN RUSSIA AND WESTERN
CNN12 05/12:31 EUROPE
[illegible]
CNN12 05/12:31 JOHN KOSKINEN: WELL THAT IS
CNN12 05/12:31 LET'S DISTINGUISH BETWEEN

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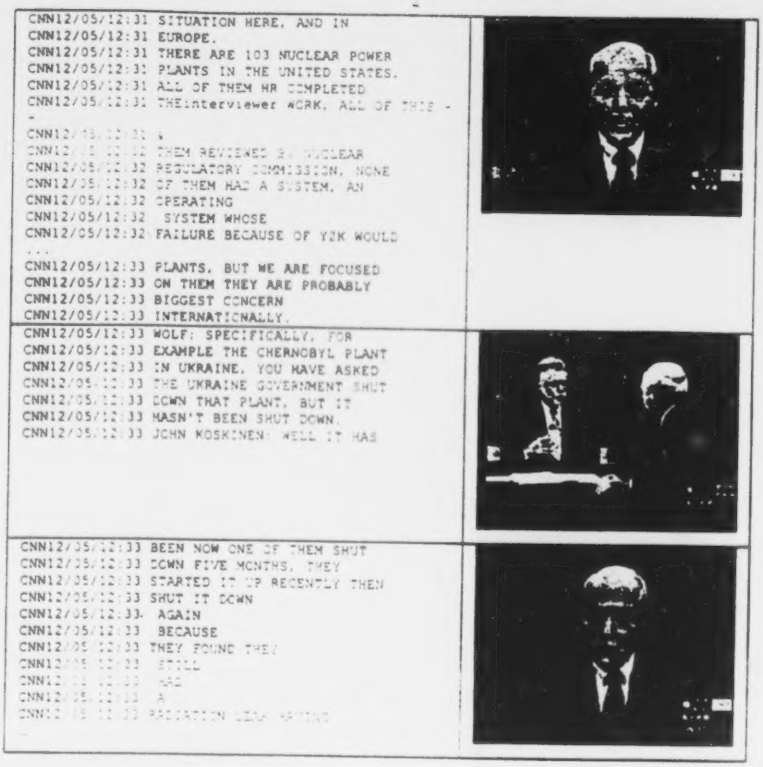
[11] There doesn't seem to be much of any difference between in-studio and satellite interviews - in the data analyzed, both followed the same visual conventions.



```
CNN12/05/12:31 SITUATION HERE. AND IN
CNN12/05/12:31 EUROPE.
CNN12/05/12:31 THERE ARE 103 NUCLEAR POWER
CNN12/05/12:31 PLANTS IN THE UNITED STATES.
CNN12/05/12:31 ALL OF THEM HR COMPLETED
CNN12/05/12:31 THEinterviewer WORK. ALL OF THIS -
-
CNN12/05/12:31 &
CNN12/05/12:32 THEM REVIEWED BY NUCLEAR
CNN12/05/12:32 REGULATORY COMMISSION, NONE
CNN12/05/12:32 OF THEM HAD A SYSTEM, AN
CNN12/05/12:32 OPERATING
CNN12/05/12:32  SYSTEM WHOSE
CNN12/05/12:32 FAILURE BECAUSE OF Y2K WOULD
...
CNN12/05/12:33 PLANTS. BUT WE ARE FOCUSED
CNN12/05/12:33 ON THEM THEY ARE PROBABLY
CNN12/05/12:33 BIGGEST CONCERN
CNN12/05/12:33 INTERNATIONALLY.
```

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CNN12/05/12:33 WOLF: SPECIFICALLY, FOR
CNN12/05/12:33 EXAMPLE THE CHERNOBYL PLANT
CNN12/05/12:33 IN UKRAINE. YOU HAVE ASKED
CNN12/05/12:33 THE UKRAINE GOVERNMENT SHUT
CNN12/05/12:33 DOWN THAT PLANT, BUT IT
CNN12/05/12:33 HASN'T BEEN SHUT DOWN.
CNN12/05/12:33 JOHN KOSKINEN: WELL IT HAS
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CNN12/05/12:33 BEEN NOW ONE OF THEM SHUT
CNN12/05/12:33 DOWN FIVE MONTHS, THEY
CNN12/05/12:33 STARTED IT UP RECENTLY THEN
CNN12/05/12:33 SHUT IT DOWN
CNN12/05/12:33  AGAIN
CNN12/05/12:33  BECAUSE
CNN12/05/12:33 THEY FOUND THEY
CNN12/05/12:33  STILL
CNN12/05/12:33  HAD
CNN12/05/12:33  A
CNN12/05/12:33 RADIATION LEAK HAPPENING
..
```

Here, the interviewer chooses not to ask a question, but to instead take a question from a caller. The full shot of the interviewer serves as a transition out of the technical Q & A sequence, as the interviewer introduces the caller, who proceeds to ask a question. What's striking about this clip is what the producers chose to put onscreen while the caller speaks. A two-shot of interviewer and expert would be gratuitous, as the caller isn't speaking to the interviewer. However, in the visual grammar of the newscast, a full shot of only the expert corresponds with him speaking. Thus, the solution is an odd hybrid, with Koskinen on a TV screen in the foreground, and both him and the interviewer in the background. This image is a sort of compromise, depicting Kokinen as we presume the caller sees him, on a TV screen, while saving the authority of the shot of expert alone for his response. After the question is asked and answered, the interview falls right back into the technical Q & A shot sequence described above.

This "technical Q & A" shot sequence might also be interrupted during particularly long expert responses. During an earlier CNN interview with Koskinen (8/29), an additional video clip was displayed behind a smaller shot of him, seemingly in order to break up the visual monotony. Thus, while Koskinen speaks about possible problems with bank ATM machines, a shot of someone using an ATM appears behind him. This technique is used two more times in the interview, with regard to airplane problems and nuclear power concerns. Two points are worth noting about this *mise en scène*. First, the shots don't detract from the priority of the expert, as neither the interviewer nor anybody else is depicted. Instead, they function as illustrations of Koskinen's speech, supporting it rather than detracting from it. This leads to the second point - these additional visuals are located *behind* the expert, with his image slightly overlapping. Visually, this implies a mastery of the technical aspects of the ATM, airplane or power plant by Koskinen, who even though smaller is very deliberately "on top" of them.

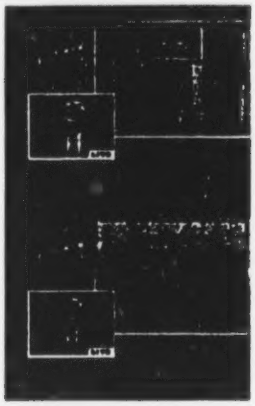
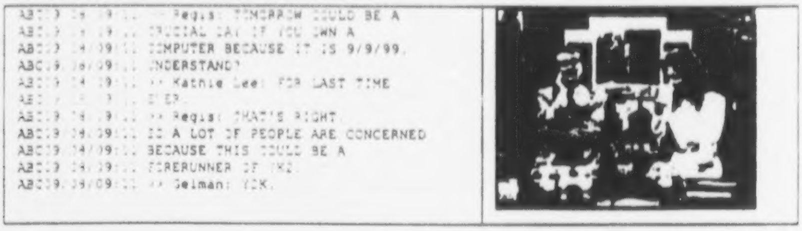


Fig. 1 – John Koskinen backed by an ATM and airplane, respectively.

The interviewees in the previous video clips are very explicitly identified as technical experts, each heading a task force dealing specifically with Y2K technical issues. However, the very same visual grammar can be applied to any individual who adopts a "technical expert" identity, regardless of his or her qualifications. In the following segment from the daytime talk show "Live with Regis and Kathie Lee," the producer, Gelman, plays this role: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ABC09 04/09 >> Regis: TOMORROW COULD BE A
ABC09 04/09 CRUCIAL DAY IF YOU OWN A
ABC09 04/09 COMPUTER BECAUSE IT IS 9/9/99.
ABC09 04/09 UNDERSTAND?
ABC09 04/09 >> Kathie Lee: FOR LAST TIME
ABC09 04/09 EVER.
ABC09 04/09 >> Regis: THAT'S RIGHT.
ABC09 04/09 SO A LOT OF PEOPLE ARE CONCERNED
ABC09 04/09 BECAUSE THIS COULD BE A
ABC09 04/09 FORERUNNER OF Y2K.
ABC09 04/09 >> Gelman: Y2K.
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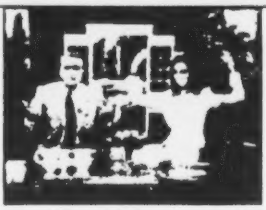
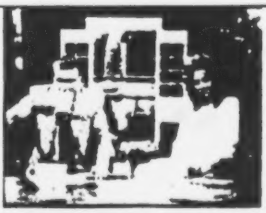
ABC09/08/09:11 >> Regis: Y2K.
ABC09/08/09:11 SEE,

I DON'T CARE WHAT I SAY, HOW
ABC09/08/09:11 IT COMES OUT.
ABC09/08/09:11 I GOT THE JOB!



ABC09/08/09:12 SO HERE TO EXPLAIN THE PHENOMENA
ABC09/08/09:12 OF 9999 IS BELIEVE IT OR GELMAN.
ABC09/08/09:12 >> Kathie Lee: OH, GOOD.

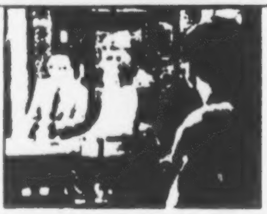


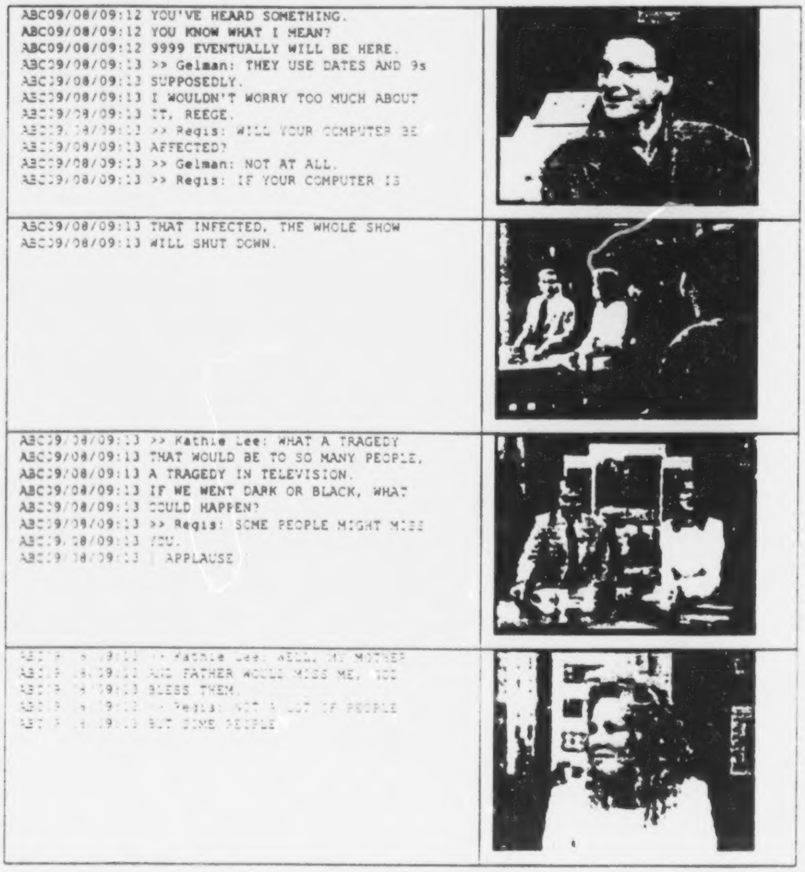
ABC09/08/09:12 >> Regis: WHAT DOES THIS MEAN,
ABC09/08/09:12 GELMAN?
ABC09/08/09:12 IF YOU OWN A COMPUTER, SHOULD
ABC09/08/09:12 YOU BE FRIGHTENED?
ABC09/08/09:12 >> Gelman: SOME SAY YOU SHOULD.
ABC09/08/09:12 OTHERS SAY YOU SHOULDN'T.
ABC09/08/09:12 PROGRAMMERS WERE USING 9/9/99 AS
ABC09/08/09:12 A SHUTDOWN COMMAND.
ABC09/08/09:12 CERTAIN COMPUTERS SUPPOSEDLY
ABC09/08/09:12 WILL MALFUNCTION LIKE THEY WILL
ABC09/08/09:12 WHEN THE YEAR 2000.

ABC09/08/09:12 >> Kathie Lee: WHY WAS IT MADE
ABC09/08/09:12 AS A SHUTDOWN COMMAND.

ABC09/08/09:12 >> Gelman: IT WAS AN UNLIKELY
ABC09/08/09:12 NUMBER TO OCCUR.
ABC09/08/09:12 NOW, IT IS OCCURRING.
ABC09/08/09:12 >> Kathie Lee: THEY DIDN'T KNOW
ABC09/08/09:12 THAT SOME DAY IT WOULD BE HERE.

ABC09/08/09:12 >> Regis: THAT IS SILLY.
ABC09/08/09:12 WHY WOULDN'T THEY PUT 9999
ABC09/08/09:12 THAT WILL NEVER COME BACK UNLESS





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ABC09/08/09:12 YOU'VE HEARD SOMETHING.
ABC09/08/09:12 YOU KNOW WHAT I MEAN?
ABC09/08/09:12 9999 EVENTUALLY WILL BE HERE.
ABC09/08/09:13 >> Gelman: THEY USE DATES AND 9s
ABC09/08/09:13 SUPPOSEDLY.
ABC09/08/09:13 I WOULDN'T WORRY TOO MUCH ABOUT
ABC09/08/09:13 IT, REEGE.
ABC09/08/09:13 >> Regis: WILL YOUR COMPUTER BE
ABC09/08/09:13 AFFECTED?
ABC09/08/09:13 >> Gelman: NOT AT ALL.
ABC09/08/09:13 >> Regis: IF YOUR COMPUTER IS
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ABC09/08/09:13 THAT INFECTED, THE WHOLE SHOW
ABC09/08/09:13 WILL SHUT DOWN.
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ABC09/08/09:13 >> Kathie Lee: WHAT A TRAGEDY
ABC09/08/09:13 THAT WOULD BE TO SO MANY PEOPLE,
ABC09/08/09:13 A TRAGEDY IN TELEVISION.
ABC09/08/09:13 IF WE WENT DARK OR BLACK, WHAT
ABC09/08/09:13 COULD HAPPEN?
ABC09/09/09:13 >> Regis: SOME PEOPLE MIGHT MISS
ABC09/08/09:13 YOU.
ABC09/08/09:13 [ APPLAUSE ]
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ABC09/08/09:13 >> Kathie Lee: WELL, MY MOTHER
ABC09/08/09:13 AND FATHER WOULD MISS ME, GOD
ABC09/08/09:13 BLESS THEM.
ABC09/08/09:13 >> Regis: NOT A LOT OF PEOPLE
ABC09/08/09:13 BUT SOME PEOPLE.
```

At the beginning of this segment, both Regis and Kathie Lee are shown in a two-shot (this is the default *mise en scène* for this show, which generally revolves around the interplay between the two hosts). Then, after Regis displays his technical incompetence (by mispronouncing "Y2K"), we see a reaction shot, showing his embarrassment while the audience laughs. At this point, Regis deliberately shifts tone, marking the transition from humor to a serious discussion of Y2K with the somber phrase "so here to explain..." at which point Gelman is introduced.

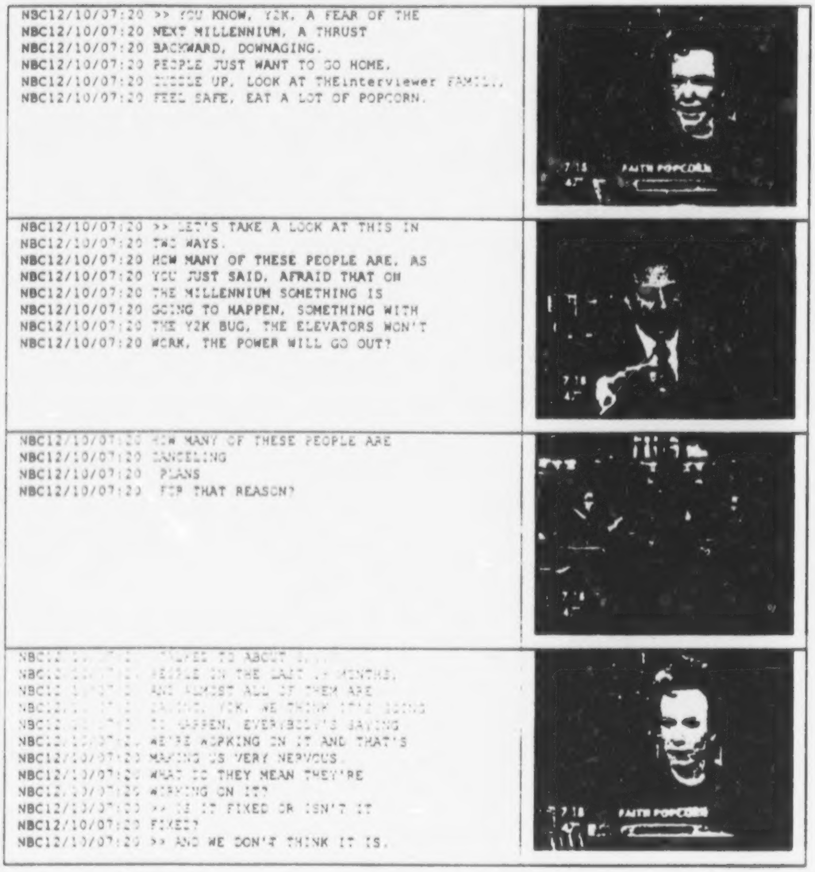
For the next minute or two, Regis, Kathie Lee, and Gelman play out the same relationship between interviewer and interviewee-as-technical-expert as we found in more traditional contexts. Both interviewers ask open questions which prompt their expert for a technical response on the nature of the 9/9/99 problem. Moreover, the visual grammar of this sequence is strikingly similar to the technical

Q & A shot sequence found in the news interviews, alternating between a shot of the interviewee and an over-the-shoulder shot from the interviewee's perspective of the interviewers. This is particularly interesting in the context of "Live with Regis and Kathie Lee," a show which in large part focuses on the performance of its hosts - here, even when Regis makes a joke, he visually remains very much in the background. This sequence marks a distinct shift in tone from the show's status quo, a shift that seems to be directly triggered by the construction of Gelman as a technical expert.

The interviewer/technical expert relationship is prominent, but wasn't the only dyadic relationship in which Y2K was discussed on television. In other cases, Year 2000 problems were discussed with markedly more balanced conversational and visual rhetoric. In these cases, it seems that the interviewee is being constructed as an expert, but one whose area of expertise is non-technical - unimposing and accessible to both the interviewer and the public.

For example, on December 12, NBC's Matt Lauer interviewed an expert on "lifestyle trends" regarding public perceptions of Y2K:

NBC12/10/07:19 >> SO WHY IS THE MILLENNIUM NBC12/10/07:19 TURNING OUT TO BE A BIT OF A NBC12/10/07:19 BUST?	
NBC12/10/07:19 FAITH POPCORN IS THE FOUNDER OF NBC12/10/07:20 BRAINRESERVE, NBC12/10/07:20 WHICH NBC12/10/07:20 TRACKS NBC12/10/07:20 LIFESTYLE TRENDS.	
NBC12/10/07:20 WHAT HAPPENED?	



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NBC12/10/07:20 >> YOU KNOW, Y2K, A FEAR OF THE
NBC12/10/07:20 NEXT MILLENNIUM, A THRUST
NBC12/10/07:20 BACKWARD, DOWNAGING.
NBC12/10/07:20 PEOPLE JUST WANT TO GO HOME,
NBC12/10/07:20 CUDDLE UP, LOOK AT THEinterviewer FAMILY,
NBC12/10/07:20 FEEL SAFE, EAT A LOT OF POPCORN.
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NBC12/10/07:20 >> LET'S TAKE A LOOK AT THIS IN
NBC12/10/07:20 TWO WAYS.
NBC12/10/07:20 HOW MANY OF THESE PEOPLE ARE, AS
NBC12/10/07:20 YOU JUST SAID, AFRAID THAT ON
NBC12/10/07:20 THE MILLENNIUM SOMETHING IS
NBC12/10/07:20 GOING TO HAPPEN, SOMETHING WITH
NBC12/10/07:20 THE Y2K BUG, THE ELEVATORS WON'T
NBC12/10/07:20 WORK, THE POWER WILL GO OUT?
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NBC12/10/07:20 HOW MANY OF THESE PEOPLE ARE
NBC12/10/07:20 CANCELING
NBC12/10/07:20  PLANS
NBC12/10/07:20  FOR THAT REASON?
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NBC12/10/07:20 TALKED TO ABOUT [illegible]
NBC12/10/07:20 PEOPLE IN THE LAST [illegible] MONTHS,
NBC12/10/07:20 AND ALMOST ALL OF THEM ARE
NBC12/10/07:20 SAYING, Y2K, WE THINK IT'S GOING
NBC12/10/07:20 TO HAPPEN, EVERYBODY'S SAYING
NBC12/10/07:20 WE'RE WORKING ON IT AND THAT'S
NBC12/10/07:20 MAKING US VERY NERVOUS.
NBC12/10/07:20 WHAT DO THEY MEAN THEY'RE
NBC12/10/07:20 WORKING ON IT?
NBC12/10/07:20 >> IS IT FIXED OR ISN'T IT
NBC12/10/07:20 FIXED?
NBC12/10/07:20 >> AND WE DON'T THINK IT IS.
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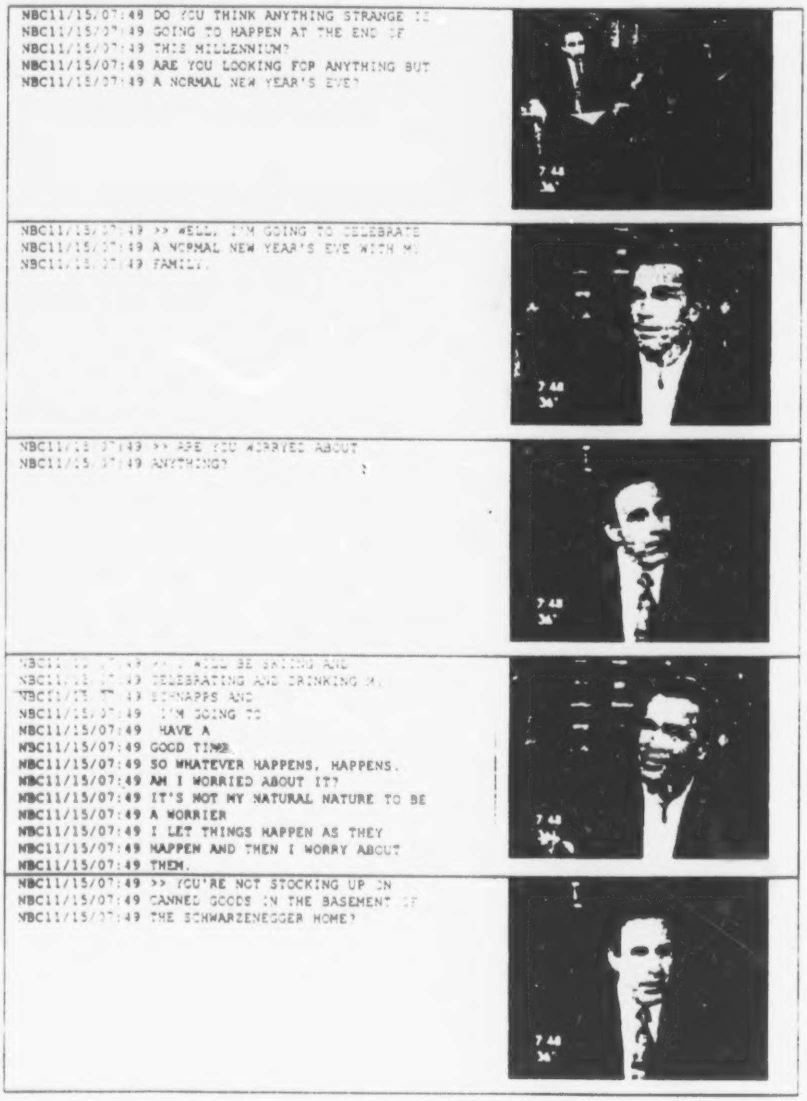
Here, we find a different relationship between interviewer and expert than that discussed in the previous section. Matt Lauer is much more of an active participant in the conversation, framing his question as a mutual topic of discussion - "*Let's* take a look at this…" (italics mine) - rather than simply to provoke a response. The conversation is bi-directional, with both parties contributing meaningfully to the discussion, and this is reflected in the visual rhetoric of the sequence. The focus is put on whoever is speaking, and the interviewer and interviewee are treated equivalently by the camera. In this way, the interviewer is elevated to the same level as the interviewee.

This type of relationship seems to be particularly common during morning network newscasts, which tend to be more relaxed and familiar to viewers (the sets for shows like "Today" or "Good Morning America" are designed to resemble kitchens or living rooms). These shows tend to place a higher emphasis on practical knowledge, with a much higher percentage of guests having what might be considered "non-technical" expertise, like the aforementioned "lifestyle" expert presenting people's reactions to Y2K, or an expert on consumer affairs discussing Y2K scams (see NBC12/09/08:15). In such cases, the conversation of the interviewer and expert is relatively calm, with the interviewer contributing meaningfully to the discussion.

Another type of exchange that falls into this category is the celebrity interview:



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NBC11/15/07:48 DO YOU THINK ANYTHING STRANGE IS
NBC11/15/07:49 GOING TO HAPPEN AT THE END OF
NBC11/15/07:49 THIS MILLENNIUM?
NBC11/15/07:49 ARE YOU LOOKING FOR ANYTHING BUT
NBC11/15/07:49 A NORMAL NEW YEAR'S EVE?
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NBC11/15/07:49 >> WELL, I'M GOING TO CELEBRATE
NBC11/15/07:49 A NORMAL NEW YEAR'S EVE WITH MY
NBC11/15/07:49 FAMILY.
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NBC11/15/07:49 >> ARE YOU WORRYED ABOUT
NBC11/15/07:49 ANYTHING?
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NBC11/15/07:49 >> I WILL BE SKIING AND
NBC11/15/07:49 CELEBRATING AND DRINKING MY
NBC11/15/07:49 SCHNAPPS AND
NBC11/15/07:49  I'M GOING TO
NBC11/15/07:49  HAVE A
NBC11/15/07:49 GOOD TIME
NBC11/15/07:49 SO WHATEVER HAPPENS, HAPPENS.
NBC11/15/07:49 AM I WORRIED ABOUT IT?
NBC11/15/07:49 IT'S NOT MY NATURAL NATURE TO BE
NBC11/15/07:49 A WORRIER
NBC11/15/07:49 I LET THINGS HAPPEN AS THEY
NBC11/15/07:49 HAPPEN AND THEN I WORRY ABOUT
NBC11/15/07:49 THEM.
```

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NBC11/15/07:49 >> YOU'RE NOT STOCKING UP ON
NBC11/15/07:49 CANNED GOODS IN THE BASEMENT OF
NBC11/15/07:49 THE SCHWARZENEGGER HOME?
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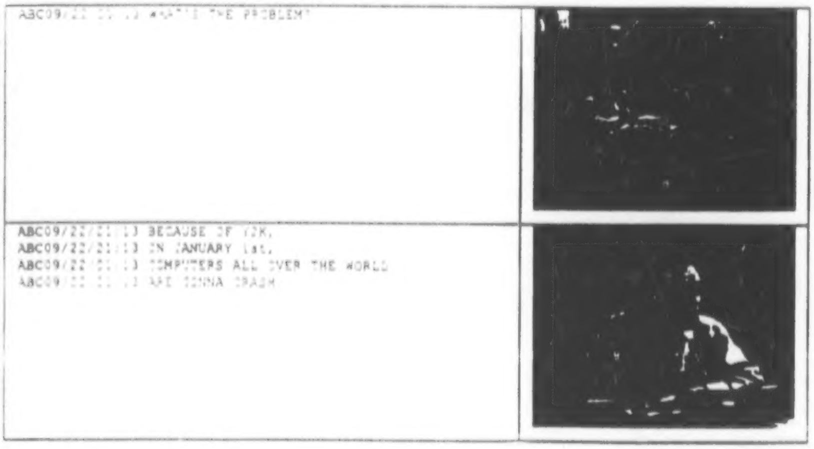
NBC11/15/07:49 >> I THINK MY WIFE IS, PROBABLY.	
NBC11/15/07:49 >> WHAT ABOUT THE Y2K BUG? NBC11/15/07:49 EITHER OF YOU WORRIED ABOUT NBC11/15/07:49 THAT?	
NBC11/15/07:49 >> I'M NOT WORRIED ABOUT NBC11/15/07:49 ANYTHING. NBC11/15/07:49 I THINK ALL THE COMPUTERS CAN NBC11/15/07:49 BREAK DOWN. NBC11/15/07:49 I WILL BE SKIING AND HAVE A NBC11/15/07:49 GREAT TIME. NBC11/15/07:49 THE SLOPES DON'T NEED ANY NBC11/15/07:49 COMPUTERS, TRUST ME.	

If one knew nothing whatsoever about Arnold Schwarzenegger before viewing this segment, one would walk away with the very clear impression that Schwarzenegger as an interviewee was not being identified as an expert on the technical details of Y2K. Conversationally, the interviewer asks the interviewee four times about his Y2K worries and/or preparations, each time receiving a negative response. As the interview progresses, it becomes clear that the primary purpose of this sequence is not to find out about Schwarzenegger's thoughts on Y2K, but to offer the opportunity for mutual joking between the interviewer and interviewee. The interviewer's "question" about canned goods (delivered in a wry tone) is intended as a joke rather than an honest question, playing on current stereotypes about Y2K preparedness, and the interviewee's laughing response is an approval of the joke. A few moments later, the roles are reversed, with the interviewee making a joke about computers and skiing, which is followed by a reaction shot of the interviewer, laughing.

Fig. 2 – Conversation between Katie Couric and Jay Leno (NBC12/31/21:51).

The production of humor seems to be a frequent occurrence in non-technical dyads. For example a conversation between Katie Couric and Jay Leno on New Year's Eve seemed solely intended as comic relief from the rather serious daylong newscast that NBC had been broadcasting. What's intriguing about this sequence is that it takes place within the same visual framing as serious, technical interviews earlier that day, but with one marked difference: Couric (as interviewer) introduces Leno (as interviewee), and we move to a split-screen shot of the two of them, which doesn't change for the next two minutes. There is no cutting back and forth in a technical Q & A shot sequence. Instead, the entire exchange (in which Leno tries out a few of his monologue jokes for later that evening) takes place with both interviewer and interviewee on screen the whole time. Emphasis is not placed solely on the interviewee's words, but on the interviewer's reaction to them.

This emphasis on the interviewer's reactions is even clearer in a sequence from the ABC sitcom "The Drew Carey Show" in which Drew (the protagonist) comes face to face with his company's Y2K consultant, and asks what's going on:



ABC09/22/21:13 WHAT'S THE PROBLEM?

ABC09/22/21:13 BECAUSE OF Y2K,
ABC09/22/21:13 ON JANUARY 1st,
ABC09/22/21:13 COMPUTERS ALL OVER THE WORLD
ABC09/22/21:13 ARE GONNA CRASH

```
ABC09/22/21:13 BANKS ARE GOING
ABC09/22/21:13 TO LOSE YOUR RECORDS.
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ABC09/22/21:13 THE COMPUTERS
ABC09/22/21:13 THAT CONTROL THE FLOW OF OIL
ABC09/22/21:13 DOWN THE PIPELINES
ABC09/22/21:13 ARE GONNA CLOSE.
ABC09/22/21:13 THE POWER GRIDS
ABC09/22/21:13 ARE GONNA SHUT DOWN,
ABC09/22/21:13 AND THE GROCERY SHELVES
ABC09/22/21:13 ARE GONNA BE EMPTY.
ABC09/22/21:13 THERE'LL BE NO WATER, NO FOOD,
ABC09/22/21:13 NO HEAT, NO LIGHT,
ABC09/22/21:13 AND THERE'LL BE RIOTING
ABC09/22/21:13 IN THE STREETS!
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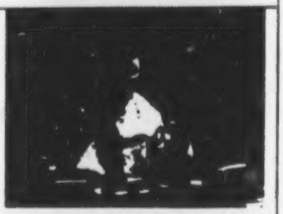

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ABC09/22/21:13 IF YOU'RE LUCKY, DREW.
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ABC09/22/21:13 YOU'LL STARVE AND FREEZE
ABC09/22/21:13 TO DEATH IN THE DARK.
```

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ABC09/22/21:13 I THINK YOU NEED A WINDOW
ABC09/22/21:13 IN HERE, BUDDY.
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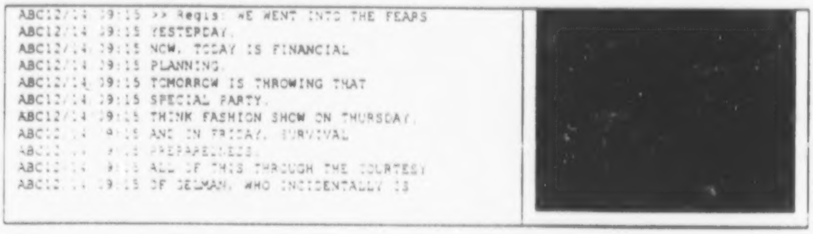
This sequence plays on the public image of "Y2K nuts," overzealous Cassandras who felt it was their duty to warn the world about the perils of Y2K. What's striking about this clip is that for all intents and purposes, the interviewee (the Y2K consultant) fits the stock image of a qualified computer expert - he's sitting behind a computer, in a darkened office lit only by the glow of his monitor. Just before this sequence, he has fixed another computer problem. He seems to speak with authority, and his words themselves (aside from the last part about starving and freezing) aren't really that different from those of the more pessimistic "real" experts. However, he's clearly a source of entertainment, not information.

What marks this sequence as humorous, rather than informational? In part, the vitriolic tone with which the consultant spits out his diatribe (because after all, no technical expert would ever get so passionate!), but more important is the context of the sequence. The clip takes place in the middle of a fictional comedy show where, unlike news programs, the default intention is to entertain. The interviewee appears not to inform, but to provoke an entertaining response from the protagonist (interviewer). This structure is reinforced by the editing - twice during the interviewee's speech, we cut to the interviewer for a reaction shot, and the entire sequence culminates in the interviewer's joking defusing of the expert's credibility (implying some sort of delusion or overstress).

An important feature of the identities of both interviewer and interviewee in any particular dyad is that they are not fixed. The role that each plays is malleable and changeable, and participants in a conversation can change the nature of their relationship at the drop of a hat. However, it's important to point out that this doesn't mean that one speaker can create a role for himself or herself that the other speaker must necessarily accept. An identity like "technical expert" is a mutual construction of both interviewer and expert, and both need to be playing along in order to maintain it.

Earlier, I described the ways in which Gelman, the producer of "Live with Regis and Kathie Lee," was identified as a technical expert both conversationally and visually in the course of a segment on the show. However, at other times his identification with Y2K is ridiculed, for example in the context of a discussion about a weeklong look at Y2K that he set up for the program:



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ABC12/14 09:15 >> Regis: WE WENT INTO THE FEARS
ABC12/14 09:15 YESTERDAY.
ABC12/14 09:15 NOW, TODAY IS FINANCIAL
ABC12/14 09:15 PLANNING.
ABC12/14 09:15 TOMORROW IS THROWING THAT
ABC12/14 09:15 SPECIAL PARTY.
ABC12/14 09:15 THINK FASHION SHOW ON THURSDAY.
ABC12/14 09:15 AND ON FRIDAY, SURVIVAL
ABC12/14 09:15 PREPAREDNESS.
ABC12/14 09:15 ALL OF THIS THROUGH THE COURTESY
ABC12/14 09:15 OF GELMAN, WHO INCIDENTALLY IS
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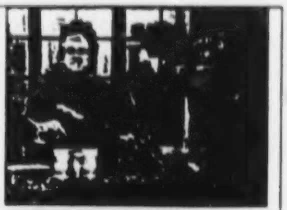
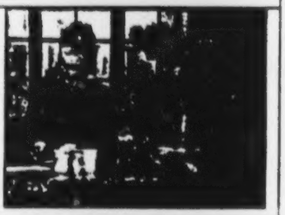
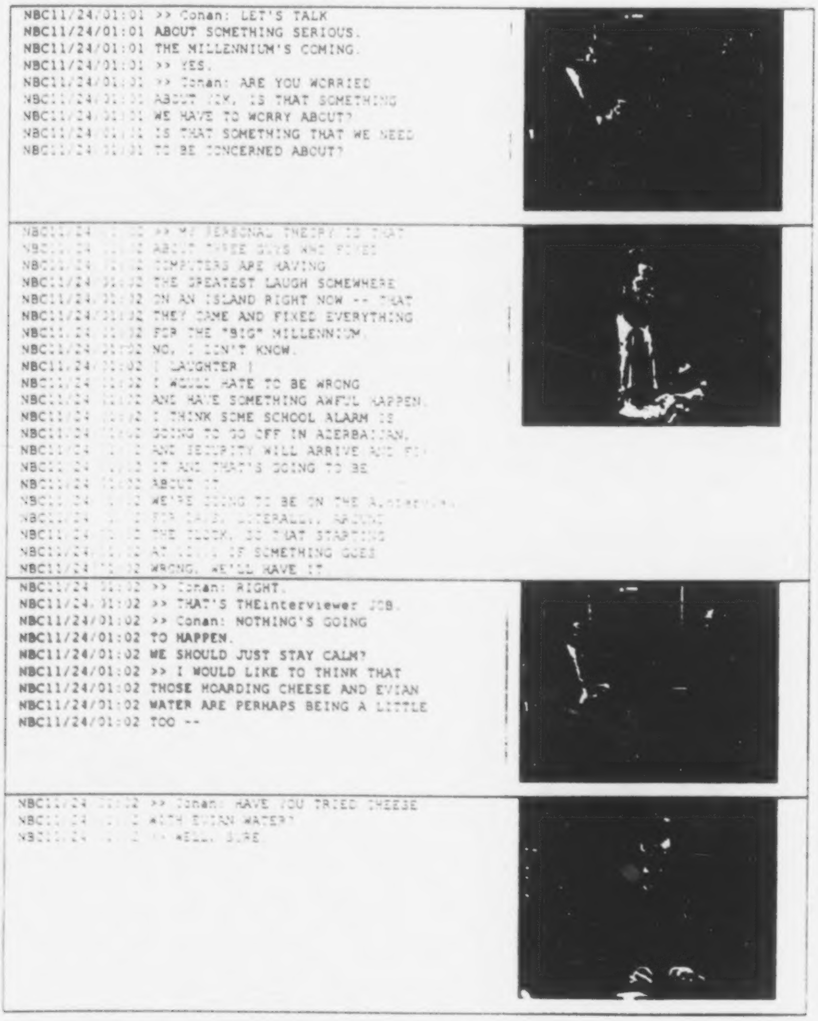
ABC12/14/09:15 SCARED TO DEATH ABOUT Y2K.	
ABC12/14/09:15 >> Kathie Lee: ARE YOU REALLY, ABC12/14/09:15 GELMAN? ABC12/14/09:15 >> Gelman: NO, I'M NOT.	
ABC12/14/09:15 >> Regis: YES, YOU ARE. ABC12/14/09:15 >> Kathie Lee: ARE YOU ABC12/14/09:15 TRAVELING?	
ABC12/14/09:15 >> Gelman: NO, I'LL BE IN MY ABC12/14/09:15 BUNKER.	
ABC12/14/09:15 >> Kathie Lee: YOUR BUNKER. ABC12/14/09:15 >> Regis: I GO TO GELMAN AND I ABC12/14/09:15 WHISPER IN HIS EAR, Y2K ABC12/14/09:15 AND GELMAN'S HANDS BEGIN TO ABC12/14/09:15 TREMBLE. ABC12/14/09:16 >> Regis: IT IS JUST ANOTHER ABC12/14/09:16 NIGHT ABC12/14/09:16 WE'RE ALL GETTING SILLY ABOUT ABC12/14/09:16 THIS. ABC12/14/09:16 MY MAIN CONCERN IS WILL I STILL ABC12/14/09:16 HAVE THE FLU? ABC12/14/09:16 [LAUGHTER]	

The structure of this sequence is markedly different from the earlier exchange with Gelman as a technical expert. Here, his role isn't as a source of information, but rather as the butt of a joke, with the primary product of the conversation being entertainment rather than education. Both interviewee and interviewers play along with this shift in identity, started by Regis when he refers to Gelman as "scared to death about Y2K." In doing so, he casts Gelman not as a dispassionate expert, but as a zealot akin to the "Drew Carey" consultant. Gelman initially tries to shrug this off with a confused denial, but after being pressed acknowledges his new identity, sarcastically referring to his "bunker."

This sequence is visually different from the "Live…" clip discussed earlier, this time consisting of alternating shots of interviewers and interviewee. Regis' kinetic gestures dominate the sequence, rather than being minimized in the background, as they were when Gelman was playing the expert. Regis clearly controls this exchange, having the first and last word on Gelman's Y2K opinions.

Another example of this sort of shifting is found in a conversation on late-night television between Conan O'Brien (a popular late-night television host) and his guest, Brian Williams (an anchor on the MSNBC cable news channel):



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NBC11/24/01:01 >> Conan: LET'S TALK
NBC11/24/01:01 ABOUT SOMETHING SERIOUS.
NBC11/24/01:01 THE MILLENNIUM'S COMING.
NBC11/24/01:01 >> YES.
NBC11/24/01:01 >> Conan: ARE YOU WORRIED
NBC11/24/01:01 ABOUT Y2K, IS THAT SOMETHING
NBC11/24/01:01 WE HAVE TO WORRY ABOUT?
NBC11/24/01:01 IS THAT SOMETHING THAT WE NEED
NBC11/24/01:01 TO BE CONCERNED ABOUT?
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NBC11/24/01:02 >> MY PERSONAL THEORY IS THAT
NBC11/24/01:02 ABOUT THREE GUYS WHO FIXED
NBC11/24/01:02 COMPUTERS ARE HAVING
NBC11/24/01:02 THE GREATEST LAUGH SOMEWHERE
NBC11/24/01:02 ON AN ISLAND RIGHT NOW -- THAT
NBC11/24/01:02 THEY CAME AND FIXED EVERYTHING
NBC11/24/01:02 FOR THE "BIG" MILLENNIUM.
NBC11/24/01:02 NO, I DON'T KNOW.
NBC11/24/01:02 [ LAUGHTER ]
NBC11/24/01:02 I WOULD HATE TO BE WRONG
NBC11/24/01:02 AND HAVE SOMETHING AWFUL HAPPEN.
NBC11/24/01:02 I THINK SOME SCHOOL ALARM IS
NBC11/24/01:02 GOING TO GO OFF IN AZERBAIJAN,
NBC11/24/01:02 AND SECURITY WILL ARRIVE AND FIX
NBC11/24/01:02 IT AND THAT'S GOING TO BE
NBC11/24/01:02 ABOUT IT.
NBC11/24/01:02 WE'RE GOING TO BE ON THE A[illegible]
NBC11/24/01:02 FOR DAYS, LITERALLY, AROUND
NBC11/24/01:02 THE CLOCK, SO THAT STARTING
NBC11/24/01:02 AT [illegible] IF SOMETHING GOES
NBC11/24/01:02 WRONG, WE'LL HAVE IT.
```

```
NBC11/24/01:02 >> Conan: RIGHT.
NBC11/24/01:02 >> THAT'S THEinterviewer JOB.
NBC11/24/01:02 >> Conan: NOTHING'S GOING
NBC11/24/01:02 TO HAPPEN.
NBC11/24/01:02 WE SHOULD JUST STAY CALM?
NBC11/24/01:02 >> I WOULD LIKE TO THINK THAT
NBC11/24/01:02 THOSE HOARDING CHEESE AND EVIAN
NBC11/24/01:02 WATER ARE PERHAPS BEING A LITTLE
NBC11/24/01:02 TOO --
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NBC11/24/01:02 >> Conan: HAVE YOU TRIED CHEESE
NBC11/24/01:02 WITH EVIAN WATER?
NBC11/24/01:02 >> WELL, SURE.
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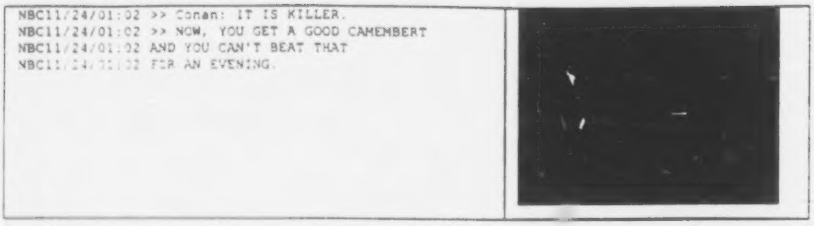

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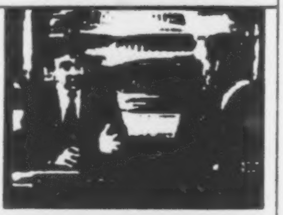
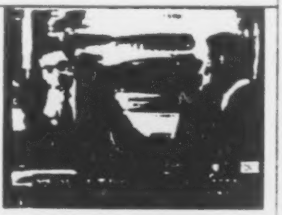
NBC11/24/01:02 >> Conan: IT IS KILLER.
NBC11/24/01:02 >> NOW, YOU GET A GOOD CAMEMBERT
NBC11/24/01:02 AND YOU CAN'T BEAT THAT
NBC11/24/01:02 FOR AN EVENING.
```

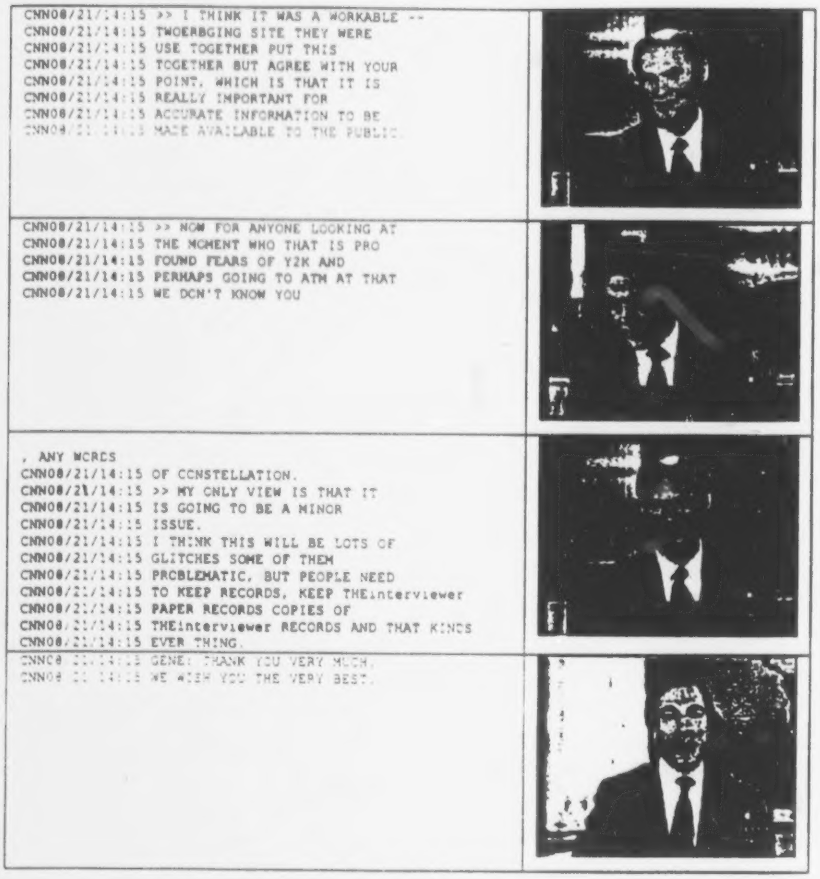
In this case, it's the interviewer who is trying to maintain his guest's identity as a technical expert, while Williams refuses to cooperate. The sequence comes after a light-hearted discussion of the interviewee's college days, but the interviewer indicates a shift in tone with his non-facetious request "Let's talk about something serious." The interviewee, a major news anchor, is being constructed as an expert with access to privileged information, someone who can actually state whether Y2K is "something we need to be concerned about." The two-shot of interviewer and interviewee followed by the close-up on the interviewee also might be setting up Williams as a technical expert.

However, the interviewee resists any shift into an expert stance. He proceeds to make several jokes about Y2K, all playing off of the expert identity that the interviewer tried to set up. The interviewer makes one more attempt at a serious question - "We should just stay calm?" - that is followed by another interviewee joke about food hoarding, at which point the interviewer gives up and joins the joking. At that moment, a close-up of O'Brien breaks the visual rhetoric of the technical Q & A sequence as he reasserts his previous stance as an entertainer.

This sort of identity play most often takes place in the context of joking, where humor can be used to smoothly negotiate anxiety or incongruity (Mulkay 1984), but there are occasions when a shift in the footing of one conversant will be more abrupt and directly confrontational. One example of such a shift can occur when an interviewer asserts himself or herself with regard to the subject matter of the expert's expertise. In an August 21 interview with Bruce McConnell (the aforementioned director of the International Y2K Cooperation Center), the interviewer does just this.

The first part of the interview follows the standard interviewer-technical expert format, alternating between open questions (along with a two-shot of interviewer and interviewee) and the expert's responses (shown in a close-up of the interviewee). However, the interviewer breaks this rhythm:

CNN08/21/14:14 >> MR. MIX CON NATIONAL VERY CNN08/21/14:14 INTERESTING INCIDENT ON CNN08/21/14:14 FRIDAY, WHERE A NAVY UPDATE CNN08/21/14:14 OF Y2K REPORT	
BECAME CNN08/21/14:14 PUBLIC. CNN08/21/14:14 AND ON ITS SURFACE IT CNN08/21/14:14 SPELLED OUT A GRIM PROSPECT	
CNN08/21/14:14 FOR THE DOZENS OF AMERICAN CNN08/21/14:14 CITIES TOTAL OR PARTIAL CNN08/21/14:14 BREAKDOWNS OF ELECTRONIC, CNN08/21/14:14 THE GAS SYSTEM THE WATER CNN08/21/14:14 SYSTEM. WELL 4:00 YESTERDAYS CNN08/21/14:14 AFTER NOON THE NAVY TROT OUT CNN08/21/14:14 ADMinterviewerAL WHO SAID IT IS NOT CNN08/21/14:14 REALLY WHAT WE MEANT.	
CNN08/21/14:14 THINGS ARE IN TERRIFIC CNN08/21/14:14 SHAPE. CNN08/21/14:14 WHAT'S DOES IT PLAY HERE? CNN08/21/14:14 >> IT IS TRE BECAUSE THERE CNN08/21/14:14 FACT THE REPORT WAS ON THE CNN08/21/14:14 PUBLIC WORLD WAIT WEB FOR -- CNN08/21/14:14 SINCE JUNE AND SO IT IS NOT CNN08/21/14:14 BEEN SUPPRESSED AT ALL IT CNN09/21/14:14 HAS BEEN OUT THERE THE OTHER CNN08/21/14:14 THING THAT WAS INTERESTING CNN08/21/14:14 BECAUSE THAT THE NAVY SAID CNN08/21/14:14 IF YOU HAD TOLL BASE COMMAND CNN08/21/14:14 DERS GO OUT CHECK WITH LOCAL CNN08/21/14:14 POWER SYSTEM AND WATER **CNN08/21/14:14 SYSTEMS TO FIND OUT HOW THEY** **CNN08/21/14:14 WERE DOING BUT TO ENTER A** **CNN08/21/14:14 CODE 3 WHICH MEANT DON'T** **CNN08/21/14:14 KNOW OR COULD BE BAD, IF** **CNN08/21/14:14 THEY DIDN'T GET ANY** **CNN08/21/14:14 INFORMATION.** **CNN08/21/14:14 SO MOTION OF THE CITIES THAT** **CNN08/21/14:14 WERE RANKED DOING POORLY** **CNN08/21/14:14 WERE ACTUALLY THEY WERE** **CNN08/21/14:14 STILL WAITING TO THAT HEAR** CNN08/21/14:14 FROM FROM THE LOCAL PROVIDER CNN08/21/14:14 WHAT THEinterviewer PLANS WERE.	
CNN08/21/14:14 >> WELL, LET'S TRY TO BE CNN08/21/14:15 KIND HERE, BUT DO THAT KIND CNN08/21/14:15 METHODOLOGY DO ANYONE ANY CNN08/21/14:15 FAVORS?	



```
CNN08/21/14:15 >> I THINK IT WAS A WORKABLE --
CNN08/21/14:15 TWOERBGING SITE THEY WERE
CNN08/21/14:15 USE TOGETHER PUT THIS
CNN08/21/14:15 TOGETHER BUT AGREE WITH YOUR
CNN08/21/14:15 POINT, WHICH IS THAT IT IS
CNN08/21/14:15 REALLY IMPORTANT FOR
CNN08/21/14:15 ACCURATE INFORMATION TO BE
CNN08/21/14:15 MADE AVAILABLE TO THE PUBLIC.

CNN08/21/14:15 >> NOW FOR ANYONE LOOKING AT
CNN08/21/14:15 THE MOMENT WHO THAT IS PRO
CNN08/21/14:15 FOUND FEARS OF Y2K AND
CNN08/21/14:15 PERHAPS GOING TO ATM AT THAT
CNN08/21/14:15 WE DON'T KNOW YOU

, ANY WORDS
CNN08/21/14:15 OF CONSTELLATION.
CNN08/21/14:15 >> MY ONLY VIEW IS THAT IT
CNN08/21/14:15 IS GOING TO BE A MINOR
CNN08/21/14:15 ISSUE.
CNN08/21/14:15 I THINK THIS WILL BE LOTS OF
CNN08/21/14:15 GLITCHES SOME OF THEM
CNN08/21/14:15 PROBLEMATIC, BUT PEOPLE NEED
CNN08/21/14:15 TO KEEP RECORDS, KEEP THEinterviewer
CNN08/21/14:15 PAPER RECORDS COPIES OF
CNN08/21/14:15 THEinterviewer RECORDS AND THAT KINDS
CNN08/21/14:15 EVER THING.

CNN08/21/14:15 GENE: THANK YOU VERY MUCH.
CNN08/21/14:15 WE WISH YOU THE VERY BEST.
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The interviewer leaves his role as passive listener, and engages with the expert on his own level, mobilizing his own expertise in the form of the Navy report on Y2K preparedness. In doing so, he puts himself into direct, balanced confrontation with a technical expert. Almost instantaneously, the visual rhetoric changes to match the conversational shift, beginning with a full shot of just the interviewer. Moreover, the second camera shot of the sequence is even a reaction shot of the expert, as he responds to the attack of the interviewer. From the moment of this "surprise attack" onward, the standard interviewer/technical expert relationship is both conversationally and visually disrupted, and the character of the conversation and the shot sequence shifts from cooperative to adversarial.

In the last months of 1999, the government and industry saw Y2K as a public problem. The threat was no longer just technological, but social - there was "proper" behavior (withdrawing enough money from one's bank to last a week or two) and "improper" behavior, which could lead to disaster (like withdrawing every penny on one's savings account). This social threat meant that the public needed to be "educated" by the mass media, in particular in the most public of public arenas, on television. The use of expertise to educate as it played out before and after New Years Day resonates strongly with the relationship between experts and the public as described by sociological PUS work, in that the dominance of technical experts wasn't inherent, but was in some sense ceded by the public.

On television, news anchors and talk show hosts can be seen as surrogates for the public. The populism of American television news is an oft-discussed topic (Hallin 1987), and here it helps to elaborate on the relationship between experts and their publics. In a very real sense, news interviewers are our on-screen surrogates - they ask questions for us, and serve as a gateway to sources and experiences which we as viewers might not otherwise experience. The relationship between a news interviewer and his or her subject is in some sense an exemplar for the audience's relationship with that subject. Thus, if an interviewer takes a subordinate position to an interviewer, deferring to the expert's greater knowledge, audience members are experientially put into that very same subordinate position. When an interviewee is shown full-screen, it's as if he or she is speaking directly to the viewing audience. In the case at hand, these techniques serve to create a viewing experience that reinforces the dominant status of technical experts. By the same token, if the interviewer is more foregrounded, presented in a more balanced relationship with the interviewee, the epistemological priority of the interviewee is reduced. Thus, lifestyle experts and celebrities are interesting subjects to talk with, compared with technical experts who are there to be *listened to*.

I'm not trying to argue here that fundamental causes determine the visual rhetoric I've described above. In the cases examined, while the conversational aspects of expertise are fundamentally the result of the interaction of the conversants (and their writers), the visual aspects are the product of a broader network of cameramen, producers, editors and set designers who help to produce a television program. I would personally argue that this visual rhetoric can be seen as a materialization of broader cultural trends, but for the moment I'd rather leave that question open - it's far too easy to essentialize about the root causes of what shows up on the screen (consider debates over *auteur* vs. studio-centered film theories). Regardless of how it got there, however, it seems clear that there is some correspondence between conversational turn-taking and visual shot sequence in the examples I've described.

Television images of experts help to reinforce the very cultural structures of public ignorance in the face of technical expertise upon which they draw. In some ways, they help to produce their own strength. While a microanalysis like this is useful in getting at the mechanics of these images, it shouldn't be taken as a causal explanation of their force. A useful next step would be an audience study, to see whether experts filmed in what I've above called the technical Q & A format are really perceived as more authoritative than those filmed using other conventions. By the same token, ethnographic studies of television production might shed some light on how these particular images make it on screen in the first place.

Ultimately, this survey has very little to do specifically with Y2K. I've used the Year 2000 problem as a wedge to get at the various constructions of expertise that surround any scientific or technological problem. The problem might just as easily have been Mad Cow disease or the Microsoft Anti-Trust action. The benefit of focusing on Y2K is that it took hold of the popular consciousness for a specific period of time, and was associated with very specific images - we've seen how images of food hoarding and bunkers were deployed in the construction (or more often, deconstruction) of expertise. Y2K serves as an exemplary case of the creation of images of technical expertise on television. These images correspond with the broader epistemological dominance of scientific and technological expertise in modern society, offering a unidirectional image of technical communication between knowledgeable experts and an ignorant public.

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Video Cited

All names refer to 15-minute blocks of programming recorded off a cable feed in Ithaca, NY between August 1, 1999 and January 31, 2000. At the time of writing, the archive was in the possession of the author, but will eventually become a Special Collection of the Cornell University Library.

CNN, August 21, 14:00
CNN, August 21, 14:15
CNN, August 29, 12:15
ABC, September 8, 9:00
CNN, September 11, 17:15
ABC, September 22, 21:30
NBC, November 15, 07:45

NBC, November 24, 01:00

CNN, December 5, 12:30

NBC, December 9, 08:15

NBC, December 10, 07:15

ABC, December 14, 09:15

NBC, December 31, 21:45

THEORY AND PRACTICE OF PUBLIC MEETINGS

Presented to the Science Communication Interest Group

at the 2000 AEJMC Annual Convention

in Phoenix, Arizona, August 9-12th

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THEORY AND PRACTICE OF PUBLIC MEETINGS

Abstract

Public meetings are among the most commonly used, frequently criticized, yet least understood methods of public participation in environmental management. Yet while systematic research is sparse, a vast amount of experiential knowledge exists, which can form the basis for a working theory on why some public meetings work, and why others do not. This paper offers a working theory of successful public meetings based on interviews with 35 state environmental and health department officials.

THEORY AND PRACTICE OF PUBLIC MEETINGS

Rather than citizen-initiated efforts, the responsibility of organizing public participation often falls to the public agencies elected or appointed to provide managerial and regulatory oversight for community-related environmental issues. This responsibility requires that agencies choose the most judicious and appropriate method of public participation from among a multitude of possibilities for any given situation. In the United States, the public meeting is one of the most commonly chosen.

Relative to their widespread use, very little research systematically examines public meetings, including the attitudes of people who attend them, those who conduct them, or quite simply, the outcomes of public meetings. To gain a better understanding of public meetings, this paper focuses on the views of the second, people who conduct public meetings. More specifically, this paper examines the views of public agency officials from state environmental and health departments who, during their careers, have amassed a wealth of experiences communicating science at public meetings. While not the sole source of knowledge on public meetings, these officials can nevertheless offer valuable insight into the meeting process and its outcomes. Their experiences may provide a useful foundation on which to construct a working theory of public meetings, which is seen as largely lacking to this point (Fiorino, 1990). Before turning to these experiences, however, some background on public meetings is useful.

Public meetings and public participation

Public meetings can be defined as non-restricted gatherings of three or more people for the purposes of discussion, problem-solving, developing recommendations, providing information, reviewing projects, and so forth. As such, they serve multiple purposes, such as those involving school boards, local planning committees, zoning commissions, and various state and federal agencies, and address a wide range of topics, including those related to science, technology, and the environment. Regardless of the topic, however, all public meetings have the common characteristic of being open to any member of the public.

Because public meetings serve many purposes, different meetings may range in formality, structure, and format, and they are held both voluntarily and officially, such as when they are used to meet legal requirements for public participation. Public records of legally mandated public meetings offer additional evidence of their frequency. In New York State alone, the state's Department of Environmental Conservation (DEC) sponsored over 250 public meetings in 1998, including informational meetings, scoping sessions, and legislative hearings, to provide opportunities for public comment on proposed environmental projects. This figure, obtained from the DEC's weekly publication, the Environmental Notice Bulletin, likely represents only a portion of all public meetings held across the state. When added to other public meetings sponsored annually by other agencies, planning boards, and administrative departments at the federal, state, county, and municipal level throughout the United States—not to mention voluntary-held or citizen-sponsored public meetings—it is clear that public meetings are an important form of public participation and communication in our society.

This paper uses the term, public meetings, to denote the multiple manifestations of this form of participation. People familiar with the public meeting process, for instance, may recognize that the terms, public hearings and public meetings, are often used interchangeably to describe the same method, although differences between the two may exist. In New York, for example, public hearings are typically mandated, more formal, and apt to follow well-known procedures, i.e., an audience that sits facing a podium and/or an expert panel, some sort of formal presentation, which is followed by oral comments from the audience. Some public hearings provide opportunities to take and answer questions; others do not. In comparison, public meetings are often not mandated and may be more informal and interactive than public hearings. What is called a hearing in New York, may be called a meeting in other states, and vice versa (e.g., Oklahoma, New Jersey), making the distinction between the two types confusing. Moreover, while all public meetings may not be public hearings, all public hearings could be technically considered public meetings. This paper uses the term, public meetings, to refer to all types of open meetings, including public hearings, availability sessions, and informational meetings, while also making distinctions between format and formality when necessary.

Because public meetings are so common, many people have either attended a public meeting, know someone that has, or heard or read about a meeting in the mass media. Not surprisingly, many people have opinions about public meetings, and many of these opinions are quite negative. In particular, public participation researchers have often criticized public meetings for some stereotypical weaknesses, including the meetings' adversarial formats, overly scientific or technical presentations, minor impact on ensuing decisions, and unrepresentative audiences. As Kasperson (1986) notes in a summary of participation methods used in environmental management, "One finding endorsed by all is the ineffectiveness, and often alienating effect, of communication and involvement through public hearings" (p. 280).

Much of the criticism surrounding public meetings concerns what can be described as a "minimalist" critique of public participation, meaning that public agencies use public meetings to meet minimum legal requirements for public participation without ever giving much credence to the public's input. Examining public meetings in the context of other public participation tools, Heberlein (1976), for instance, classified meetings as informative, co-optative, ritualistic, or interactive. He argues that public agencies use informative meetings to give local citizens information about a project, without intending to react to their opinions or concerns. Agencies use co-optative meetings to allow "irate citizens and interest groups let off steam and complain about the project" (p. 200), while simultaneously denying them future recourse to claim their views were unheard. Agencies use ritualistic meetings to satisfy legal requirements for public participation when little public interest is anticipated. Compared to the first three, agencies use interactive meetings the least, which is only when they sincerely intend to seek and respond to public concerns about a given topic.

Checkoway (1981) describes four similar agency uses of public meetings: (1) "to satisfy minimum legal requirements for citizen participation"; (2) "to build support for agency plans"; (3) "to diffuse antagonism"; and finally, (4) "to legitimate a decision that has already been made" (pp. 570-571). These criticisms are echoed in later articles (e.g., Kasperson, 1986) and summed up by Berry, Portney, Bablitch and Mahoney (1997), who comment:

> If an agency wanted to insulate itself from the influence of citizen groups and wanted to insure that its policies would undergo

> as little change as possible, it would be much better relying on public hearings to meet its citizen participation mandate (p. 17).

The overall impression deriving from these criticisms is that public meetings are typically biased toward agency-driven objectives and against those of potential public participants. In effect, agencies who conduct public meetings stack the ballot box in their favor.

This tendency toward a minimalist approach to public participation may be more of an artifact of tradition than the expressed intent of public agencies. Legal requirements for public meetings can trace their ancestry to the Administrative Procedures Act (APA), passed in 1946, which required federal agencies to notify the public during policy making, to offer opportunities for adjudication during a "trial type" hearings, and to hold public hearings when appropriate. As opposed to nurturing public involvement, the philosophy of the APA, according to Rosenbaum (1978), maintained that,

> The responsibility for initiating involvement largely rested with the public; involvement was to be confined to specified forms at limited points in administrative proceedings (usually late in policy development); and the public was left to its own resources in attempting to apprehend the substance and procedure attending important decisions (p. 82).

While the meaning, format, and legal obligations of public participation continued to evolve during the next 50 years, the traditional public meeting arguably remained steadfast in its format and purpose. Today, many legally required public meetings may still be used primarily to satisfy two traditional aims of public participation: (1) review and comment, and (2) consultation (Burke, 1979). While both may be geared toward accepting public input, neither legally binds agencies to act on it.

Despite some notable criticisms and weaknesses of public meetings, very little research systematically examines them, an oversight noted more than once during the last 25 years (Heberlein, 1976; Fiorino, 1990; Chess & Purcell, 1999). As a result, public meetings and their consequences remain largely undocumented or unsubstantiated by research. Given the strength of the criticisms, as well as the absence of research, that public meetings continue to be among common methods of public participation and science communication becomes problematic. If, for example, Kasperson (1986) is correct, that public meetings do little more than alienate the public, then their continued use for public participation may represent a tangible disservice to American society. Rather than providing a method of working through problems, public meetings may instead be fueling controversies. Rather than offering a forum for open discussion, they may be dampening public discourse. Little empirical evidence points either way.

This argument, that certain political processes—including some types of public meetings—hamstring society's ability to resolve problems, is well-developed in Kemmis' (1990) Community and the Politics of Place. In it, Kemmis argues,

> The common ground is there…but our prevailing way of doing things blocks us from realizing it. Our failure to realize is twofold: we do not recognize the common ground (a failure to realize its existence), and we do not make it a reality (a failure to realize its potential). This twofold failure leaves our communities poorer than they need to be (p. 64).

Instead of elucidating shared objectives, Kemmis (1990) contends that certain political processes, particularly the more adversarial types institutionalized in the U.S. legal system, obscure our similarities and exaggerate our differences.

Yet without more coordinated efforts to examine public meetings and document their outcomes, there is little evidence on which to assert that public meetings are, indeed, having deleterious effects every time they are used and should therefore be discontinued. Furthermore, because public agencies are frequently mandated and/or encouraged to hold public meetings, such arguments may prove counterproductive, as well as demoralizing. In comparison, a more defensible as well as helpful position would determine under what conditions public meetings are successful and when they are not. Though recognized as needed, such research has been largely lacking to this point (Fiorino, 1990).

In essence, what seems needed is a working or "practical" theory of public meetings, based on experiences and insights of public agency officials who conduct public meetings. A practical theory, according to Cronen (1995), is formed by understanding the patterns of interaction among people in a given situation. The theory manifests itself in the "grammars of practice," or the ways that people routinely manage given situations based on their current abilities. Just as abilities evolve, so do practical theories. Their value, Cronen (1995) argues, lies in their ability to provide useful guides for interpretation and action. He continues,

> Practical theories are assessed by their consequences. They are developed in order to make human life better. They provide ways of joining in social action so as to promote (a) socially useful description, explanation, critique, and change in situated human

> action; and (b) emergence of new abilities for all parties involved (pp. 231-232).

In this manner, a practical theory of public meetings could offer a useful "road map" or guide for public agencies and their officials mandated or encouraged to use public meetings in planning and management. A practical theory of public meetings may also explain certain tendencies on the agency's behalf that hinder the utility of public meetings, while offering recourse for their improvement.

In some sense, practical theories of public meetings already exist (e.g., Heberlein, 1976, and Checkoway, 1981). By nature, however, practical theories are working theories and subject to change as the abilities of those who use them change (Cronen, 1995). Whether the practical theories of public meetings asserted 20-25 years ago are still accurate today is unclear.

A practical theory of public meetings is also useful given the competing ideas of what it means to be successful in public participation (discussed in detail in the following section). Rather than imposing researcher-defined criteria for success, a practical theory is guided by the experiences and abilities of those who conduct and participate in public meetings. The benefits for practitioners and researchers alike may include better practices and better theories (Webler, 1999).

To develop a practical theory of public meetings, this paper focuses on the experiences of public agency officials from environmental and health departments who conduct public meetings. Clearly, another important aspect of this research are the experiences of citizens who attend public meetings. While this paper does not include these experiences, their documentation and analysis would comprise essential future steps in the study of public meetings.

This paper next reviews past and current models of successful public participation, paying specific attention to research on public meetings. The paper then turns to the practice of public meetings to examine when public agency officials who conduct public meetings characterize them as successful. Based on this examination, some working theories of public meetings begin to emerge.

Characterizing successful public participation

A review of the literature on public participation reveals a lack of an agreed-upon set of criteria for successful public participation, which is understandable given the diversity of goals and opinions of public participation programs, their practitioners, and their participants (Chess & Purcell, 1999; Webler, 1999). A review of only a portion of the studies suggests over a dozen criteria of success, including the level of technical complexity (Langton, 1978); the costs of participation (Langton, 1978); incentives for citizens to participate (Fiorino, 1990; Langton, 1978); representativeness in citizen participation (Langton, 1978; Heberlein, 1976; Berry et al., 1997); extent to which non-experts participate directly in the decision (Fiorino, 1990; Wynne, 1992); the extent to which non-experts share in the collective decision (Fiorino, 1990); the extent to which non-experts and experts have ongoing face-to-face communication (Fiorino, 1990); the extent to which non-experts participate equally with experts and officials (Fiorino, 1990); the variety of viewpoints drawn into the discussion (Fiorino, 1990); the responsiveness of those in charge to citizens needs (Heberlein, 1976; Berry et al., 1997); knowledge of public participants (Heberlein, 1976); and an overall author/evaluator assessment of how well the program is working (Berry et al., 1997).

To make sense of it all, Chess and Purcell (1999) suggest categorizing criteria for success according to whether they primarily focus on processes or outcomes. Process-oriented criteria weigh a program's success against its implementation. Measures include how many people participated, how many spoke, how fair was the process, how well was the meeting publicized, did dialogue occur, and so forth. Outcome-oriented criteria, in comparison, gauge success against the results of the public participation effort. Measures include whether participants' comments were useful, whether their comments influenced the decision, whether participants were satisfied with the process, or whether relationships between the agencies and participants improved as a result of the meeting.

Much of the research on public meetings examines what Chess and Purcell (1999) term process criteria, such as whether the meeting structure was fair (Checkoway, 1981; Richardson, Sherman, & Gismondi, 1993) or whether participants represented a broader community (Sinclair, 1977; Gundry & Heberlein, 1984; Kihl, 1985; Johnson, Johnson, Edwards, & Wheaton, 1993; McComas & Scherer, 1998). Less research examines the outcomes of public meetings, although that which has tends to suggest that, while public meetings rarely promote consensus on an issue, they do sometimes influence government decisions and spending (Chess & Purcell, 1999; Cole & Caputo, 1984).

Whether successful processes always produce successful outcomes is unclear, however. Although Chess and Purcell (1999) found that successful processes tended to correspond with successful outcomes, in some cases, they found that the process was deemed successful whereas the outcome is not, and vice versa. In fact, they suggest that some public meetings may become influential precisely because of process problems, such as their being viewed as unfair, which then serves to catalyze community protest. In this manner, poor processes may sometimes lead to good outcomes, and good processes lead to poor outcomes, though what is "good" or "poor" with regard to process and outcomes is clearly a matter of perspective.

The next section examines how public agency officials characterize successful public meetings, paying particular attention to whether and how officials discuss process and outcome criteria. The analysis then leads to a discussion of their responses, including whether any recurring patterns are evident that may offer insight into officials' working theories of public meetings.

The study

In the summer of 1998 and the winter of 1999, the author conducted 35 in-depth, open-ended, telephone interviews with New York State environmental and health agency officials. Criteria for selecting the officials included their having previous experience (e.g., conducting, presenting information, answering questions) with public meetings. Names were obtained from "sign-in sheets" used at state-sponsored public meetings, state government web sites listing officials responsible for citizen participation efforts, and word-of-mouth referrals. The author initiated contact by sending letters introducing the research, assuring confidentiality, and containing an outline of the questions. These letters were then followed in one week by telephone calls to verify the letter's receipt and to schedule a convenient time for the interview. No one declined the interview, which was envisioned to last 20 minutes. In practice, some of the interviews lasted 15 minutes while others over 90, depending on the interest and wishes of the official being interviewed. Two officials who were unable to sit for a telephone interview sent in their answers by mail.

Several of the officials contacted preferred not to be tape recorded, so a tape recorder was not used for any of the interviews. Instead, the author hand-wrote and transcribed the answers. While this technique allows the interviewer to record themes, impressions, and a selection of quotes, the drawbacks include a decreased accuracy in long quotations, the possibility of missed or misinterpreted sentiments, and an inability to return to the complete text for any sort of systematic content or rhetorical analysis. Given the potentially sensitive nature of the subject, the benefits of encouraging more open and frank responses to the public meeting questions were judged to outweigh the drawbacks.

Four open-ended questions comprised the interview. Because the term, public meeting, could bring several images to mind, the first question asked officials to describe what they considered a public meeting and then to estimate the number of meetings they had ever attended and in what capacity. The next question asked officials to describe what makes a successful public meeting, and what being successful means. Officials were then asked how they thought public meetings could be improved. The fourth question asked officials to what extent they were satisfied with public meetings as a means of involving citizens in planning decisions. The present analysis is based on an examination of their responses.

Officials' experiences with public meetings

The officials' backgrounds represent a diverse yet extensive range of experience with public meetings. During their careers with the state environmental or health agencies, more than half of the officials said they had attended well over 50 public meetings; some reported attending "hundreds" and others "thousands." Some officials were relative newcomers to their positions (e.g., three to six months) while others had been with their respective state agencies for over 25 years. Some were politically appointed while others career civil servants. Primary responsibilities within their respective agencies included citizen participation specialists; permit administrators; project managers; public health specialists; and water, hazardous waste, and environmental engineers.

At the public meetings, officials had experiences with planning, setting up, and conducting the meetings; presenting information, facilitating discussions, and answering questions at the meetings; and writing summaries and following up on questions after the meetings. The meeting formats discussed during the interviews included very formal (e.g., adjudicatory public hearings held before a judge) to very informal (e.g., "open house" sessions or roundtable discussions), and the topics ranged from wildlife to water quality to waste management.

When asked to describe what they considered a public meeting, most officials responded by summarizing official public meetings conducted by their agencies, i.e., legislative public hearings, adjudicatory hearings, issues conferences, informational public meetings, and scoping sessions. More than one official noted that the public may not know the difference between the different types of meetings and that this confusion sometimes led to problems at the meetings. Some officials described additional factors that prompt meetings to take place, such as getting people together to generate ideas or impressions of projects, obtaining public comment, or providing information.

What makes a successful public meeting?

When asked, what makes a successful public meeting, officials noted process and outcome-oriented criteria, meaning that they were concerned with both evaluating the meeting itself—how it was executed, how it was received—as well as examining its ensuing impacts. Generally, officials' responses can be categorized according to events and actions taking place before the meeting, at the meeting, and after the meeting. Because many officials mentioned several characteristics, listing all of them would be overwhelming. Those characteristics most frequently mentioned, and the number of officials mentioning them, are briefly summarized below.

Before the meeting

Nearly one-third of the officials said that knowing who the audience is facilitates a public meeting's success. This includes anticipating the audience's needs and concerns and planning the meeting accordingly. It also means ensuring that the targeted audience receives adequate notice of the meeting so that people who may be interested in the topic know about the meeting to attend. It also means not scheduling the meetings during holidays, when people will be less likely to attend.

Eight of the 35 officials stated that the success of a public meeting depends on the meeting's objective. Better meetings have a clearly stated purpose of which both the agency and the public is aware. One official said that public meetings tend to be overused, especially when public input is not truly being sought. "Let them know when a decision has already been made, or [the meeting will] backfire," suggested another.

Eight officials said that a meeting's success depends on the technical presentations. Although many officials said that presentations were useful, none recommended lengthy ones. "People don't want to sit through long presentations," noted one official. "We are successful when we are brief and concise in our presentations, and thorough in our answers to questions," noted another.

Seven officials said that a meeting's success depends on choosing an accessible location, building, time, and appropriate room size for the meeting. Again, officials noted that these choices are often guided by knowing who the audience is and anticipating its reactions. One official suggested, only somewhat tongue-in-cheek, that conducting a public meeting in a church cuts down on yelling.

Five officials stated that choosing the appropriate meeting format contributes to a meeting's success. Although some meetings are more formal due to procedural requirements, officials noted that other meetings have more built-in flexibility. One official illustrated how a potentially very controversial public meeting was successfully averted through the use of a more informal meeting format:

> There was one situation in another region where they were going to have a public meeting but people were really ticked off. Instead, they had an open house, where exhibits were set up and it lasted all day. Instead of having a big public meeting where people could grandstand, the open house method diffused the situation.

The "open house" method, which is very similar to availability sessions or poster presentations, was mentioned by other officials, who again mentioned that these formats were particularly helpful for diffusing antagonism at the meetings. At other times, informal formats may place people more at ease and encourage more listening, as one official described in writing below:

> I remember one public meeting a few years ago on a chemical company beginning to address some groundwater and soil contamination. Members of the community for years had been very hostile toward the company for contaminating their resources. The meeting was held in a small homey-style room with couches, soft lights and reading tables....There was a particular point in time at the meeting when the plant manager and one of the more vocal community leaders began to actively listen to each other. That moment in time was a turning point for the site's citizen participation efforts. Since then, the hostility has vanished although the contamination remains.

Five officials said that having the appropriate staff and agencies present to answer questions that may arise at the meeting was important to a meeting's success, and three officials recommended having good handouts (e.g., fact sheets, agendas) at the meeting.

Finally, three officials said that a meeting's success depends on its timing in the overall decision process. "Public meetings need to be fairly early in the process—not the week before a decision is made, but early on," noted one officials. In comparison, meetings that are scheduled too late in the decision process can anger meeting participants.

At the meeting

Many of the characteristics of successful public meetings relate to what occurs at the meeting itself. More than one-third of the officials said that having dialogue take place between officials and participants at the meeting was important to a meeting's success. For some officials, this meant listening to questions and providing useful answers. One official candidly noted that agencies sometimes have a challenge listening: “There’s a tendency to use [meetings] more to provide information and less to get information. It tends to be one-way rather than two-way in the government.” For others, this meant allowing time for one-on-one interactions before or after the meeting.

Seven officials stated that having a strong facilitator or meeting moderator to set ground rules and keep the meeting focused is important to a meeting’s success. “Regardless of whether it’s a meeting or a hearing, it needs to be run as a tight ship,” suggested one official. This can be difficult, noted another, given the many different and often competing agendas in the room.

Six officials said that being open, honest, and candid with the audience was important to having a successful public meeting. “You’re better off telling the truth,” stated one official, even though there may be consequences back at the agency.

Two officials considered flexibility essential to a meeting’s success. In some cases, that means a quick change of plans if more people show up at the meeting than were expected. One official described how a quick change of formats met the challenge of a larger-than-anticipated audience:

> There was one meeting where 500 people showed up to make a comment. We used an army of flipcharts and a facilitator. We broke into small groups to get their comments. The meeting was held early in the process, and we made an effort to get their input. It lent credibility to [us] that we were truly looking for [the audience’s] input.

At other times, flexibility at the meeting means just letting participants vent.

The actual size attendance was only mentioned by two officials, and bigger did not always mean better. One official said successful meetings can happen "when no one shows up," which may mean that communication prior to the meeting adequately answered people's questions, and people felt no need to come to the meeting. If they believed they had adequately publicized the meeting, most officials were satisfied that people who were most interested in the meeting attended it.

After the meeting

According to the officials' responses, several criteria that influence a meeting's success take place after the meeting. Most of these criteria converge on the officials' demonstrating to the audience how its comments were incorporated in the outcome. Five officials said that this sort of responsiveness was essential to showing that the meeting was not a pretense. "The public needs some sense of recognition that they've been heard. They should receive at least a summary of the decision, if not individual comments, as a follow-up," suggested one official.

Four officials said they measured success by whether participants felt that the meeting was worth their time to attend. At least two officials each said that they measured success by whether they believed they connected with the audience, had continued dialogue with citizens, received fair and balanced media coverage of the meeting, and a noted decreased hostility between the public and agency. Two also said frankly, "getting out of there alive," meant the meeting was successful. Finally, another two officials noted that a simple "thank you" from a public meeting participant on his or her way out the door was an indication that the meeting was successful.

How would you improve public meetings?

After describing what makes a successful public meeting, officials were asked how public meetings could be improved. Most of their suggestions focused on ways to improve the process of public meetings. In particular, over one-third of the officials said that meetings could be improved with better training of officials prior to the meeting, including spending more time on speaker preparation, rehearsals, technical presentations, cultural sensitivity, and language usage.

Three officials said that they wished participants who attended meetings arrived with a better understanding of the meeting's purpose and how it fits within the legislated decision making process. Two officials wished participants were less hostile at the meetings, and another two said that more internal support for public meetings would be an improvement. As one official commented,

> Public meetings are many times seen by project managers as a necessary evil that only slows downs projects. …Division supervisors…may control the budget and see the need to new desks, but not displays or refreshments for a public meeting.

Other suggestions frequently mentioned included having a strong meeting facilitator that keeps the meeting on course, enforcing ground rules of civility, publishing an agenda prior to the meeting so that participants know what to expect, creating better mailing lists, providing better follow-up after the meetings, and allowing more time for discussion and questions during the meeting.

How satisfied are you with public meetings?

Officials were then asked to what extent they were satisfied with public meetings as a way to involve citizens in environmental planning. Seven officials were unabashedly positive in their assessment of public meetings, with one official noting that public meetings satisfy an "ideal" by providing, "greater opportunities for people to participate and also to have more informed choices." Others noted additional benefits, including that participants felt more ownership of the decision or that participants perceived the decision as more legitimate. Others mentioned that public meetings were useful if for no other means than that meetings provided participants a place to vent. Finally, some noted how the public input received at the meeting sometimes influences decisions.

Eleven officials said they were satisfied with public meeting as long as they were used properly or with other public participation methods. Explanations included that people cannot always attend public meetings, that people may feel uncomfortable speaking in public, or that meetings occur too late in the process for input to make much difference. "It's frustrating that there isn't a way of involving people sooner," stated one official.

Another 12 officials essentially said "yes and no," in terms of their satisfaction. Some mentioned logistical drawbacks to public meetings, including the degree of work involved to plan and conduct public meetings, the conflicting agendas of participants and organizers, the potential for bad timing, and the possibility of poor communication at the meetings.

Five officials said they were totally unsatisfied with public meetings as methods of public participation. Their reasons included that participants generally misunderstood the regulatory process and its constraints, that meetings occur too late in the process to matter, that meetings did not satisfy the audiences' need for information, and that audiences doubted the credibility of those conducting the meeting.

Discussion

The analysis of officials' responses provides a starting point for the development of a practical theory of public meetings grounded in the experiential knowledge of those frequently mandated or encouraged to conduct public meetings. The summary of the responses suggest that officials have developed a range of criteria based on their experiences with public meetings regarding what worked and what did not. Over time, it seems that these experiences have coalesced into checklists that officials employ to aid them in the preparation and execution of public meetings. Many officials reported having such checklists, and one or two even said they read from them when answering the questions in this study.

With regard to a practical theory of successful public meetings, the analysis of responses suggests that officials generally equate successful meetings with successful processes. That is, they deemed meetings successful when the right people attended, when there was adequate public notice, when the presentations were clear, when the format included dialogue, when the agenda was followed, and so forth. In developing their checklists, officials seem to be trying to unveil a formula for successful public meetings, of which process variables comprise a formidable part. Officials also mentioned outcome criteria when describing successful public meetings, yet based on their responses, the way to achieve successful outcomes seems to be by perfecting the process. Whether their overemphasis on the process leads officials to overlook other factors bearing on the outcomes merits further consideration (Kemmis, 1990).

In the officials' attempts to develop a formula for successful public meetings, the audience is somewhat of a "wild card" in the equation. While a review of their responses demonstrates that officials place great emphasis on knowing the audience in order to have successful public meetings, this prior knowledge potentially serves two purposes. From a benevolent standpoint, it enables officials to custom design the public meeting to meet the audience's needs and objectives. A less charitable argument, in comparison, might point out that prior knowledge helps officials to plan a meeting that minimizes negative audience impacts that could reduce the likelihood of achieving their objectives. Among other strategies for reducing audience impacts at the meeting include imposing time limits on oral comments, using open house formats to discourage grandstanding, and holding the meeting in a church. Whether officials should be faulted for trying to maximize their chances of meeting their objectives is the topic of another discussion, as well as being one which others have addressed (e.g., Checkoway, 1981). Understanding why officials tend to focus on the process over the outcome when describing successful public meetings is the subject of current efforts.

There are some practical explanations for officials' tendencies to emphasize process over outcome criteria in their responses. Process criteria offer officials tangible yardsticks for evaluating a meeting's success time and again, whereas what constitutes a good or bad outcome is typically more subjective. Process criteria, including who attends, where the meeting is held, and what the format is, are also more under agency control, whereas outcomes are arguably less so. By asserting control over the process, including the structure of the meeting, officials may be able to increase the likelihood of meeting their objectives.

Officials' satisfaction with public meetings seems more related to a meeting's outcome than to the process, suggesting that officials seek something more out of public meetings than simply having a good turnout. Officials most satisfied with meetings said that they improved agency-public relations, offered insight into decisions, enhanced agency credibility with participants, and served the ideals of democratic decision making. Those least satisfied said essentially the opposite: that public meetings damaged agency relations with the public or that they occur too late in the process to matter.

Generally, the analysis of responses suggests that most officials are moderately satisfied with public meetings, and not simply for reasons frequently noted by their critics (e.g., Heberlein, 1976; Checkoway, 1981; Kasperson, 1986). Among possible explanations for the magnanimous views of public meetings are that the sample was too small or overly specialized. Only 35 officials were interviewed, and all of the officials were health or environmental professionals. Future research should build on this foundation with additional interviews from a variety of public sectors. Similar interviews conducted with practitioners representing the private sector would also offer some interesting and insightful comparisons.

Another explanation for this satisfaction is that officials provided what they considered socially desirable responses during the interview. In other words, they did not want to appear against public participation, whatever the format, so they gave more "politically correct" opinions about public meetings than they might have under different circumstances. Despite assurances of confidentiality, other officials may have been concerned that their responses would somehow be traced back to them. While both explanations may be true for a portion of the responses, the frankness of other responses indicates that many officials tried to offer honest perspectives on public meetings. In addition, the 100 percent response rate and the willingness of officials to spend over an hour at times, or to talk after work at others, discussing their experiences suggest that meetings are generally a salient topic, and one with which many of them have struggled at one time or another. Their interest in talking about public meetings also suggests that many seek ways to improve them.

A third possibility is simply that not all public meetings live up to their bad reputations. More than one official quoted the well-known adage, "Don't throw the baby out with the bath water." The stereotypical images of public meetings, including chair-throwing participants, tearful supplicants, and stoic government officials, may actually represent only a minority of pubic meetings, if even that. The reasons why these images exist or persist merit further consideration. What is the role of the mass media, for instance, in the possible perpetuation of these stereotypes? More than one official said that fair and balanced media coverage was important to having a successful public meeting.

That most officials were only moderately satisfied with public meetings also implies that many officials were frustrated at some level with this form of participation. The analysis of their responses indicates that much of their frustration revolved around factors outside of their immediate control that threatened the meeting's success. Officials were frustrated, for instance, when public meetings were held without a clear issue or too late in the decision making process. They were also frustrated when participants arrived at the meetings with unrealistic expectations, unrelated political agendas, or an unruly amount of rage and anger. They were also frustrated when they received what they considered to be unfair media coverage. In turn, officials envisioned public meetings where civility, order, and dialogue presided. This type of frustration may be a problem inherent to meetings, however. Schwartzman (1989), in her comprehensive look at meetings of many types, suggests that:

> [Meetings] generate the appearance that reason and logical processes are guiding discussions and decisions, whereas they facilitate…relationship negotiations, struggles, and commentary. It is this process that can make meetings such frustrating occasions because they appear to be doing one thing whereas, in many ways, they accomplish something entirely different. When viewed from this perspective, it is possible to see why meetings are so common as well as so maligned in American society (pp. 42-43).

Try as they might, the officials' attempts to run the meeting as a "tight ship" may not offset the impact of competing objectives of others at the meeting.

To say that meetings serve different purposes for different people is axiomatic. While not the focus of this paper, understanding the objectives and experiences of citizens is an important next step in research on public meetings. Among questions to consider include whether citizens who attend public meetings tend to emphasize process or outcome criteria when describing successful public meetings. How process and outcome criteria relate to participants' satisfaction with public meetings is another avenue of inquiry. Without doubt, the addition of citizens' experiences will facilitate a more comprehensive understanding of what takes place at public meetings.

In its simplest sense, this paper offers some useful recommendations on how to hold a successful public meetings based on the experiences officials who have learned over time what tends to work, and what tends not to work, and refined their abilities accordingly. Yet at a more complex level, it offers some insight into how officials typically characterize successful public meetings, and more specifically, how they tend to match successful processes to successful outcomes. Whether this emphasis on the process offers a useful guide for others trying to conduct successful public meetings merits further reflection and research. In particular, this working theory of public meetings appears to contradict other research, which suggests that a positive relationship between processes and outcomes does not always exist (Chess & Purcell, 1999). While this may be a case where practice informs theory, future research should attempt to clarify the relationship.

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Understanding environmentalism and information effects in water conservation behavior: A comparison of three communities sharing a watershed.

A paper presented to the Science Communication Interest Group at the annual convention of the Association for Education in Journalism and Mass Communication, Phoenix, August 2000

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Acknowledgments. The work presented in this article was supported by a grant to the authors from the National Science Foundation (EPA-NSF Partnership for Environmental Research, Decision-Making and Valuation for Environmental Policy Section, Grant No. SBR-9896386). The use of human subjects in this work was reviewed and approved by the University of Wisconsin Institutional Review Board.

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Abstract.

This paper describes a set of environmental attitudes, and their relationship to water conservation behavior. The analysis contrasts three distinct communities located in the California-Nevada Truckee River watershed. The communities can be described as water-rich, water-poor, and high-growth metropolitan with increasing water needs. The focus is on the question of community-level differences that could be relevant to relationships involving environmentalism and water conservation. The characteristics of such differences, or the lack thereof, can provide important information for water resource planners—especially with respect to the execution of persuasive information campaigns.

This project makes use of the theory of reasoned action, in which behavioral intention (to conserve water) is predicted by three variables: attitude toward the act, perceived social norms, and self-efficacy. To this model we also add measurements of environmentalism, past behavior, information seeking and information exposure. To evaluate our model, we completed 733 telephone interviews of a probability sample of watershed residents in August 1998. Contrary to some expectations, no significant differences in environmental values are found across the three communities. In the regression analyses, environmental values and past actions do not predict future intention to conserve in any of the communities. However, specific conservation attitudes, social norms, and information seeking do predict intention to conserve to varying degrees in all three communities. Implications for information programs are discussed.

1. Introduction

In this paper we will examine a set of variables in an effort to predict individuals' intention to conserve water in the varied communities of the Truckee River Watershed of California and Nevada. This work herein is part of a larger on-going project focusing on conservation issues in this watershed. Motivating consumers to voluntarily conserve water has, and continues to be, an important mission for a variety of interests in this area (as is typical throughout the West). How might such interests best execute such efforts, and how might they take advantage of social survey data to conceptualize and execute information and education efforts on water conservation?

Within this broader question, we specifically attend to the issue of balance between focusing such efforts on the entire watershed versus focusing on the communities within the watershed. This is an essential problem in many, even most, watershed management challenges: highly significant differences may exist among the communities in a watershed, yet all such communities must share an underlying unified relationship with the resource. This effect of "community contrast across the watershed" is an underexamined aspect of water conservation planning, especially with respect to the formulation of information and education efforts.

Before turning to a description of the details of our study, it is necessary to provide some background on this watershed. The Truckee River Watershed has its headwaters in Lake Tahoe. As the river flows down its steep canyon, it is added to by a number of reservoirs. These upstream reservoirs, constructed between 1913 and 1971, can significantly boost and extend river flow, having a combined storage capacity of 35 million cubic meters [*Jones*, 1991]. The largest community in these upper reaches of the watershed is Truckee, California. Truckee features a combination of economies: logging and tourist, with the latter dominating. A significant part of the population there is seasonal. Water availability in this area is not critical, as a significant amount of snowfall covers the area for much of the year. But because it does depend on the Truckee river, the town of Truckee is not beyond concerns for use and distribution of this resource.

Some 130 km. from the upper reaches of the watershed the Truckee River enters Nevada and transitions into the Truckee Meadows: "a bowl-shaped valley and alluvial fan area bounded by mountain ranges and hills" [*Jones*, 1991: 9]. The Truckee Meadows includes the extensively developed and rapidly growing Reno-Sparks metropolitan area. Development and growth in the Reno-Sparks area has been explosive, and is expected to accelerate, from 50,000 residents in 1950 to 190,000 in 1990 to about 280,000 in 1999. Over 400,000 are projected for 2020 [*Judson and Ramirez,* 1996].

About 50 km. east of Reno, and some 190 km. from the headwaters, the Truckee encounters a major diversion at the Derby Dam. From Derby, the Truckee Canal takes water into the Newlands Project. Established under the Reclamation Act of 1902, the project is an extensive "make the desert bloom" irrigation district surrounding the town of Fallon, some 65 km. east of Reno. About three-quarters of the 150,000 hectares of land under irrigation are used to grow alfalfa, another 15% is irrigated pasture, with the rest in mixed grains [*Willey and Yardas,* 1987]. The Newlands Project accounts for half of the water annually taken from the Truckee Watershed.

Just past the Derby Dam, the river turns north again and completes its 225 km. journey to alkaline Pyramid Lake, at an elevation of about 1,200 meters. Pyramid Lake, and the Truckee River corridor leading into the lake, are surrounded by the Pyramid Lake Paiute Indian Reservation, established in 1859. The original intent was that the residents of the reservation should be supported by agriculture. But culturally, the Paiutes were more inclined to fishing. Pyramid Lake provided a sufficient fishery until lake levels began a precipitous drop in the early 1900s, shortly after the establishment of Newlands. While it is recovering, today the lake level is nearly 20 meters lower than it was at the turn of the century, with two fish on the endangered species list.

The Truckee River Watershed greatly varies in precipitation across space and through time. Average annual precipitation ranges from 180 cm. or more on the summits of mountains to less than 25 cm. in the Truckee Meadows and beyond. In essence, this means that virtually all of the water supplying the Truckee River falls on California but drains out into Nevada. Perhaps more important, though, is the precipitation variance that occurs through natural cycles of drought and flood conditions, which can be extreme.

Due to the wide spectrum of orientations and situations presented along its 225 km. course, this watershed presents an extraordinarily rich context in which to identify and examine attitudinal and behavioral factors that influence the development, implementation, and evaluation of environmental policies involving water conservation. Understanding how the diverse set of interests within the watershed can cooperate to share a vital, highly variable, and ultimately limited resource will offer valuable lessons. Policy efforts aimed at building such cooperation will be aided by a scientific understanding of the range of orientations toward water conservation throughout the watershed. Further, the rapid growth and diversification of the Truckee Meadows metropolitan area presents an outstanding opportunity to not only understand the dynamics of water conservation attitudes during such growth but also to consider and recommend information strategies designed to promote conservation.

2. Rationale and Objectives

The goal of this work is to look at differences among the three primary water-use communities within this watershed, with an emphasis on predicting intention to conserve water. To do so, we evoke the theory of planned behavior. This well-respected model was first formulated nearly 30 years ago as the theory of reasoned action [*Fishbein,* 1967]. Its history has been recounted in numerous places [e.g., *Eagly and Chaiken,* 1993:168-218]. The theory has a parsimonious form: behavior that is under volitional control is best predicted by behavioral intention, which in turn is best predicted by the individual's attitude toward the act and the individual's perception of social norms involving the act (peer pressure, if you will). This theory was designed for situations in which relatively simple behaviors are under voluntary control. However, the theory underwent an important revision to function under circumstances in which action is not entirely voluntary, but rather is subject to the actor successfully executing one or more behaviors of varying difficulty (e.g., weight loss). The inclusion of the third antecedent variable—perceived behavioral control, or self-efficacy—transformed the theory of reasoned action into the theory of planned behavior [*Ajzen,* 1985, 1987, 1988, 1991].

Within this mix of variables we also wish to include a measure of environmentalism. The theory of planned behavior takes no account of values—higher-order attitude structures that form early and are resistant to change. Other attempts have been made to incorporate environmental values in models of behavioral intention. For example, Grob [1995] offers a model of environmental behavior in which "personal philosophical values" involving the environment were found to be a strong predictor of behavior.

In terms of measurement, distinguishing between broader environmental values and conservation-specific attitudes can be difficult. The most fruitful line of research that can be applied to this distinction involves the New Environmental Paradigm (NEP) [*Dunlap and Van Liere,* 1978]. Dunlap and Van Liere argue that there has been a long-standing Human Exemptionalist Paradigm (HEP) emphasizing progress, growth, science and technology, and individual rights. This world view, however, is being gradually displaced by the New Environmental Paradigm (NEP), a recognition of an essential environmental-economic parity, the balance of nature, the dangers of unlimited growth and the importance of humans finding sustainable relationships within natural systems.

The NEP, and its associated measurement device, have been used in a range of studies assessing scale reliability [*Noe and Snow,* 1990], behavioral prediction [*Scott and Willits,* 1994], attitudes toward wildlife [*Edgell and Nowell,* 1989], business attitudes

[*Shetzer, et al.*, 1991], and a range of other applications. These studies "provide insight into the basic values and beliefs on which more specific environmental attitudes and actions are based and serve as aids in interpreting paradigmatic shifts across time" [*Scott and Willits*, 1994: 240]. Based on our prior experience with the instrument, and a pretest to this study, we make use of a truncated version of this tool.

Finally, we also wish to include an exploratory examination of the role that information may be playing differentially in these three communities. Specifically, we include simple measures of information seeking and information exposure.

The analysis focuses on relationships among water conservation attitudes and behaviors in three communities. We ask if communities within the watershed differ in environmental values and attitudes toward conservation, given the characteristics stated above. Further, at the individual level within communities, we ask if conservation information exposure and the elements of planned behavior (norms, self-efficacy, attitude-toward-act) will be more useful predictors of water conservation actions than will be environmental values. Pitting additional variables against the "standard three" in the theory of planned behavior is recognized as a fairly standard exploratory effects test [*Conner and Armitage*, 1998].

3. Methods

The data analyzed below are based upon 733 completed interviews (46% response rate) of Truckee River Watershed residents over age 17 conducted from mid-July to mid-August 1998. General characteristics of the sample include a median age of 42 years, having lived in the area for an average of 17 years, and reporting an average annual household income between $25,000 and $35,000. The sample was 48% male. While the response rate is lower than is ideally desired, it is in line with typical experiences being had with telephone methods. Also, our sample characteristics are representatively close to 1994 estimates of the Reno-Sparks metro population made by the Nevada Bureau of Business and Economic

Research: 49% male, median age of 35 years, median income of $35,000, with 50% having lived in the area for more than 10 years [*Nevada Bureau of Business and Economic Research,* 1994].

Phone interviews were conducted by a professional survey unit, using standard CATI probability sampling techniques. For the analyses here, the respondents were divided into those residing in or near Truckee, those in the Reno-Sparks metropolitan area, and those in the Newlands area.

A truncated HEP-NEP 7-point agree-disagree index proved effective, using the dimensions of environmental abuse ("Mankind is severely abusing the environment"), balance ("The balance of nature is delicate"), and harmony ("Humans must live in harmony with nature in order to survive"). Cronbach's alpha for the three-item index was .71. Attitude toward the act of water conservation ("I personally believe it is important to conserve water") and perceived normative pressure for conservation ("People I know think water conservation is important") used the same 7-point scale, as did the self-efficacy item ("The things I can do around the house to save water won't really make much of a difference for the community").

The information seeking index consisted of two items with an alpha of .67: "How much effort have you made this year to look for information on water conservation?;" "When you come across information on saving water, how much attention do you give it?" Scoring on the 7-point scale for each was from "Absolutely none" (1) to "A great deal" (7). Information exposure was ascertained by asking "How much information about water conservation have you seen or heard from each of the following sources in the last 12 months," with 9 sources ranging from newspapers to neighbors to utility companies, again on a 7-point scale (alpha = .75). Respondents were also asked whether or not they had engaged in 9 water conservation practices previously (0 = no, 1 = yes), which were indexed (alpha = .63). Finally, behavioral intent to save water was measured by the 7-point disagree-agree item, "I intend to save more water in 1998 than I did in 1997."

4. Findings

Table 1 shows that mean values for most of the variables in this analysis do not significantly vary across the three communities. We had some casual expectations for differences in environmentalism scores, and in scores on attitudes toward water conservation—especially between the metro area and the rural Newlands area. But only three differences were found. There is what might be called an "information gradient" running from the metro area where exposure to conservation information is highest to the Truckee area where it is lowest. This is interesting, in that it may explain some subsequent findings with respect to information effects. Second, there is an age differential, with the metro area younger than the other two areas. And those who live in Truckee have, on average, lived there for fewer years.

The primary analysis is in the form of separate hierarchical regressions for each of the communities, with intention to conserve water as the dependent variable. Hierarchical regressions were configured to first account for demographics, then past actions to conserve water (with the notion that past behavior might be the best predictor of future behavior). We then include the set of reasoned action variables. The theory holds that these variables should account for all variance in behavioral intention, so the subsequent inclusion of information effects and environmental values is a stringent test of their potential effects.

After running each of the three regressions, we then tested for differences in slopes and intercepts across the three models. We did this in each case where a significant beta was presented in at least one model (income, past actions, self-efficacy, attitude-toward-act, norms, and information seeking). This analysis of covariance using dummy variables for the community conditions and interaction terms between dummies and independent variables [*Agresti & Finlay,* 1986: 455-460] indicates that no significant interactions or differences in intercepts exists across the three models. Thus, in the most strict sense, differences between models on any given variable are not significant and the best description of the data is found in an analysis combining communities. We will return to such an analysis, but nonetheless feel that some valid observations may still be made about the characteristics of each community independently of one another.

In water-rich Truckee, we see that the only variable to have much influence over intention to conserve water is normative pressure. This variable's effect, however, is very strong, accounting for about 28% of variance in intention.

In high-growth Reno-Sparks, a wide range of variables are influential. First, here we see effects of demographics, specifically income. Those with lower household incomes are more likely to be positive toward conserving water in the future. While past actions to conserve significantly increment R-square at the step, they do not remain significant in the saturated model. The real strength in this regression is the set of reasoned action variables, all of which perform as theoretically expected. Those who feel they can conserve water, who have a positive attitude toward the act, and who feel some normative pressure to do so are most likely to intend to conserve more in the future. And even with this variance account for, for those in the metro area, having sought out information on water conservation still increments R-square by 6%.

Finally, we look at the results of the regression on the Newlands segment of the data. In many ways, these results are similar to the Reno-Sparks equation. Two of the three planned behavior variables are significant, and information seeking still has an effect.

The more interesting approach to these equations is to look at, and consider reasons for, the differences observed. Elements of planned behavior significantly predicted behavioral intention in each community, and information had an effect in both the metro and in Newlands. However, differences among the communities suggested their differing circumstances and priorities with respect to water conservation. Normative pressure proved the bellwether predictor in each community, and in Truckee most notably. Only in Reno were all three planned behavior variables significantly predictive. Self-efficacy was a washout in Truckee and Newlands—perhaps for two opposite reasons. One person's actions might well not impact water-rich Truckee, or carry the day in water-struggling Newlands. But in the middle ground of Reno, each person's "vote" might carry more weight, as in a narrow vs. landslide political race.

The predictive strength of information seeking for conservation practices over mere exposure to conservation messages in all communities suggests the power of a motivational component in information impact. While exposure per se was more prevalent in Reno, the combination of active seeking and attention to the messages appears to be what counts in predicting behavior.

Surprisingly, the dictum that the "best predictor of future behavior is past behavior" was not supported here. Past conservation behaviors were decidedly poor indicators of intended future actions. One explanation may be that those already engaged in conservation activity felt they were doing about all they reasonably could. Once again, the strength of environmental values proved to be insignificant when in came to predicting actual intention to act in a way that would conserve a valued resource. The sentiment may be out there and rather evenly dispersed across communities of various needs, but the realities of those needs, and the effort and costs associated with conservation, appear better indicators of likelihood of actual action-taking.

The only demographic of note was income, and only in Reno, where the less affluent were more inclined toward conservation action. Perhaps the specter of higher water costs without voluntary conservation played into this. All in all, between a fifth and a third of the variance in intention to act was explained by this set of variables across all communities, a respectable effect in social science research of this type.

With all this said, we finally return to the analysis combining the three communities. The effects just described in the community-specific equations are clearly reflected in the global analysis. This brings us to the two most salient observations. First, less contrast was observed across these three very different communities than we expected. Second, across all communities, actively seeking information is a significant predictor of intention to conserve and environmental values are not.

5. Conclusion

The dichotomy so often found elsewhere between environmental values and behaviors [e.g., *Dunlap and Scarce*, 1991; *de Young*, 1993; *Nowak et al*, 1997; *O'Keefe and Shepard*, 1998] appeared here as well. Values essentially dropped out of a predictive model of water conservation behaviors. And this finding was consistent across three quite different communities—a water-rich one, a rapidly growing metropolitan area in an arid climate, and an agricultural community struggling to maintain its share of dwindling water rights.

Once again, the theory of planned behavior was supported, with attitude toward the act and subjective normative pressure the key predictors of intention to act (and less strongly, self-efficacy). However, the insertion of information effects substantially increased ability to predict intended action. This is an optimistic finding for conservation information and education planners, but in a limited sense. As a catalog of research literature on communication effects has been telling us for decades, simple exposure to given messages will not necessarily influence knowledge, attitude or behavioral change [see, for example: *Rogers*, 1995; *Salwen and Stacks*, 1996; *Goldberg et al.*, 1997]. Rather, citizens have to be engaged in the information presented, as a consequence of either its implicit compellingness to them and their situations, or their having sought it out themselves for some utilitarian purpose. This is especially true in the particularly difficult case of environmental information programs, which often entail the complexities of scientific uncertainties, public confusion over risk factors, the need for long term solutions and delayed remediation, community involvement, conflicts, and costs, and so forth [*Nowak et al.*, 1997; *O'Keefe and Shepard,* 1999]. However, as the data presented here and as the above sources also note, strategically planned information programs, carefully targeted and that preferably involve community participation, can be influential.

Among with key questions remaining are how to capitalize on generally positive environmental values and move behaviors more in line with them, and how information resources over time will enhance values, specific attitudes, and behaviors. And, how good a fit can be drawn across all of these factors with a hybrid model involving planned behavior, environmental values and adoption of water conservation practices.

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TABLE 1. ANOVA of 12 variables by the three communities surveyed (N = 733).

All attitude items on scale where 1 = disagree and 7 = agree.

	means			ANOVA	
Variable	**Truckee**	**Reno**	**Newlands**	**F**	**sig.**
Environmentalism	6.09	6.05	5.95	.61	.54
Attitude toward conservation	6.08	6.2	6.2	.27	.76
Normative influence on conservation	5.44	5.59	5.75	1.34	.26
Self-efficacy for conservation	4.75	4.94	4.54	2.10	.12
Intention to save water	4.49	4.69	4.74	.47	.62
Past efforts to save water	5.54	5.70	5.65	.24	.78
Exposure to conservation information	1.58	2.23	2.14	10.9	>.01
Seeking of conservation information	6.76	7.51	7.53	2.33	.09
Age	47.2	43.1	46.3	4.85	>.01
Sex (0 = female, 1 = male)	0.47	0.48	0.48	0.00	.99
Years living in watershed	11.9	17.2	18.7	6.67	>.01
Annual income (1-8 ord scale)	6.00	5.46	5.53	2.57	.07

TABLE 2. Hierarchical regression of behavioral intention on 11 variables.

All attitude items on scale where 1 = disagree and 7 = agree.

Independent Variables by Blocks **ΔR^2 and Cumulative Adjusted R^2**	**betas from saturated model** **Truckee** N = 98	 **Reno** N = 405	 **Newlands** N = 230	 **Combined** N = 733
BLOCK 1: Demographics				
Sex	-.10	-.01	-.01	-.02
Age	-.04	.03	-.05	.00
Income	.01	-.16*	-.01	-.09*
Years living in watershed	.05	-.09	-.02	-.05
ΔR^2 / Adj R^2	.10 .05	.05* .04*	.03 .01	.04* .03*
BLOCK 2: Past Actions				
Score on past actions scale	.11	-.04	-.08	-.05
ΔR^2 / Adj R^2	.05 .08	.02* .06*	.02 .02	.03* .06*
BLOCK 3: Planned Behavior				
Water conservation self-efficacy	-.01	.19*	.04	.12*
Attitude toward act of water conservation	.14	.14*	.16*	.16*
Normative pressure for conservation	.53*	.25*	.28*	.30*
ΔR^2 / Adj R^2	.28* .36*	.21* .27*	.15* .16*	.20* .25*
BLOCK 4: Information Effects				
Exposure to water conservation messages	.07	.10	.00	.06
Information seeking for conservation	.21	.22*	.21*	.20*
ΔR^2 / Adj R^2	.04 .38*	.06* .32*	.04* .19*	.04* .29*
BLOCK 5: Environmentalism				
Score on environmentalism scale	-.09	.03	.09	.03
ΔR^2 / Adj R^2	.01 .38*	.00 .32*	.01 .19*	.00 .29*

* $p < .05$